Cross-Cultural Model of Collaboration
A Synthesis Report

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On behalf of the
EU-Indian Innovation Network Project

Network Partners

Europe: University of Brighton, Brighton (UK); Technical University of Denmark (DTU), Lyngby (DK); University of Technology (RWTH), Aachen (D); University of Wales College Newport (UCWN), Newport (Wales); Istituto per Lavoro (IpL), Bologna (I)

India: University of Delhi, New Delhi; National Institute of Science, Technology and Development Studies (NISTADS), New Delhi; Punjab Agricultural University (PAU), Ludhiana (Punjab); GLS Institute (a postgraduate institute of Gujarat University), Ahmedabad (Gujarat)

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September 2002

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Cross-Cultural Model of Collaboration

Section I: Executive Summary

EU–India Cross-Cultural Innovation Network Project

This unique collaborative project nucleated an Innovation Network between European and Indian universities and research institutes, and is funded by The EU-India Economic Cross-Cultural Programme. The network focuses on the value added applications of university research into the areas of social and economic change, regional models of innovation and entrepreneurship, and their transferability between regions and cultures.

It is rooted in a fundamental recognition of cultural diversity and a deep commitment to human centred systems approaches to science and technology. Cultural in this context emphasises the social, economic and communication environments in which technology is designed and applied to solve problems.

The Cross-cultural dimension emphasises the diversity of entrepreneurial cultures both within India and the EU. Innovation refers to sustainable development of cultural, social and economic worlds. At the heart of this project is the creation of proactive and cross-disciplinary activities to facilitate the flow of innovative knowledge.

What this project has achieved is that at the institutional level the project partners have successfully created a network framework for research into the applications and impact of ICT and multimedia in socio-economic (rural development) and entrepreneurial (small and micro-enterprise, artisanal) sectors. At the bilateral institutional level, the partners have formed collaborations in action research models in the dairy sector, cluster models of innovation, postgraduate courses in IT and ICT, Multimedia tools for entrepreneurial training, and IT supported self-learning tools for collaborative learning. At the individual level, the project has opened up new opportunities for network researchers to work in cross-cultural and trans-disciplinary environments. At the EU-India cooperation level, the project has made a major contribution to the understanding of the richness of cultural traditions of research, entrepreneurship and innovation. This network framework has opened up new and sometimes unexpected possibilities of working across cultural and regional boundaries, breaking away from the traditional mono-cultural, mono-disciplinary and techno-centric model of research.
Our Approach

Evolving an action-oriented participatory approach has been central to the success of our project. The key activities of the project, especially R&D, ICT innovations, postgraduate training, publicity and dissemination, and virtual knowledge networking, were seen as an interconnected set of common actions both on functional and time scales. Senior researchers through the mechanism of exchange visits established university links by means of seminars, lectures, student supervisions and joint publication activities. This led to the extension of partner collaboration in the development of IT and multimedia training tools for entrepreneurs and stakeholders in rural development. The network coordinator acted as an *animateur* and catalyst for progression and sustained innovation. The future sustainability of the project has been assured by creating long-term networking links and bilateral collaboration between partner universities, networking of individual researchers, and extending these links to a wider community of researchers, entrepreneurs and stakeholders through the 'Virtual Innovation Network.'

Our experiences of creating, evolving and sustaining this complex network, have given us valuable insights into the working and functioning of cross-cultural collaborative environments. Some of key lessons which could be beneficial for future collaborations in cross-cultural settings are: the need for partners to own the project at early stages of its implementation; to build experience of inter-institutional, inter-regional collaborations; to create spaces for articulating cross-cultural experiences in research writing. Additionally, it should avoid too rigid a definition of cross-cultural and trans-disciplinary projects, and be aware of the formal limitations imposed by the rigidity of funding structures. The project should be built on both individual interests and institutional contexts, cultivating both big and little pictures. The network should define project activities in terms of achievable objectives, acknowledging the need to evolve a mechanism for professional recognition, to be aware of the institutional value of effective publicity, and of the need for the Coordination Centre to act as catalyst for sustained innovation.

Principles of Sustainable Collaboration

One of the key challenges of this cross-cultural collaboration was to develop future sustainability through the creation of long-term links between universities, entrepreneurs
and the civic society. We propose a set of principles of sustainability for future cross-cultural collaborations: Network Approach for multiplier effect; Commitment to Human Centred Systems; Valorisation of diversity; Principle of movement - from looseness to connectedness; Principle of institutional change process; Capacity Building; Process of monitoring as catalyst for sustained innovation; Principle of equality and distributed involvement; Coordination as principle of distributed equality; Principle of visibility for wider participation.

Project Achievements

The synthesis reports and publication generated by this project point a way forward for future cross-cultural and networking collaborations.

- A network model for future joint R & D projects, joint research studentships, visiting research fellowships, and joint research training activities - building upon the integrated framework of network workshops, exchange visits, joint R &D projects and case studies, and postgraduate training.
- Models of entrepreneurial innovation identifying aspects and knowledge transfer, and their adaptability within different regional and cultural contexts. Examples are: Production clusters in Rajkot in Gujarat, Aachen in Germany and Emilio Romagna regions; Artisan clusters in Soorat in Gujarat and Bankura regions.
- Models of interaction and networking between universities and the entrepreneurial sectors, promoting new direct links with other European and Indian programmes. An examples is the Bankura artisanal enterprise- linking Wales, NISTADS with Bankura region artisans
- An Action Research Model (based on the methodology of Scenario building and Search conference) and a network mechanism for the transfer of university research, facilitating the development of future university/enterprise networks through new inputs, such as new areas for applied research, new cross disciplinary research links and processes, participatory approaches and research training facilities. (e.g. Training workshops in Action research at PAU, DU, NISTADS).
- Training: pilot postgraduate studies and doctoral training programme, leading to a model for future joint postgraduate courses, involving new media and collaborative learning. Examples of collaboration are:
  - PAU & Brighton Collaboration: PGIT course at PAU
• DU and UWCN (Wales): Multimedia training course at DU
• DU and Aachen; Brighton and Wales; Lyngby and IpL (Bologna): Joint PhD supervision
• GLS and Brighton: Exchange of academic staff and senior researchers
• GLS and Brighton: Centre for entrepreneurship training and counselling (CED)

Sustainability
The project is an example how networks can grow from networks, and we have an extensive number of initiatives emerging from this project.
• PAU & Brighton: British Council Higher Education Link in IT Training
• UWCN & NISTADS: traditional knowledge and artisan entrepreneurship - British Heritage Research Council
• PAU & Lyngby: Farmer exchanges between PAU and Danish Folk High School
• Lyngby, Bologna, Brighton: A new European R &D link in Networking and Entrepreneurship
• Brighton, UWCN, Lyngby, Bologna: A Network of Excellence initiative: Trans-disciplinary- Networking for IST Entrepreneurship and Socio-economic Innovation
• Aachen & Bologna: A Network of Excellence initiative -“EuropeKnows”
• Brighton, Wales, DU: Future collaborations under the Asia-ICT and Asia-Link programmes
• A strategy report (White Paper) on Future Directions of Cross-Cultural Collaboration in applied research and the innovation process, and its role and impact on the growth and dissemination of cross cultural knowledge.

Future Direction of Cross-Cultural Collaboration

Building on our experience, we believe that there is a strong case for a medium/long term programme of strategic cross-cultural and trans-disciplinary research, building upon technological innovations and Asia’s huge pool of tacit knowledge and creative enterprise. There is an urgent need for policy makers in both continents to develop a research framework programme, which promotes networks of research communities functioning across institutions and regions of Asia.

We believe that our effective contribution to this strategy would be to continue to build on the foundations of the EU-India Innovation Network project. Our proposed virtual
network is an effective way of developing a new action-oriented framework for shaping new technology for socio-economic innovation, particularly for sustainable rural development.

**Virtual institute of cross-cultural innovation**

We propose to set up a “Virtual Institute of Cross-Cultural Innovation” to develop research strategies for the knowledge based economy. An integral component of this ‘Institute’ will be the creation of a virtual network of postgraduate, doctoral and post-doctoral researchers to facilitate collaboration between the universities, enterprises and stakeholders through research projects, action research, case studies and feasibility studies. The fellows of the Institute will act as coordinators and policy makers, while the associate fellows of the institute will act as mediators and supervisors of postgraduate and doctoral students of the institute networks. The focus will be on the transfer of knowledge from the universities and regional knowledge centres to the enterprises as well as on the transfer of the tacit dimension of knowledge from the enterprises to the knowledge centres and the universities, both within and beyond the EU-Asia context.

The inclusion of universities and research centres from outside the EU-India Network, will create a critical mass of researchers and practitioners who will participate in the creation of processes, mechanisms and environments for integrating trans-disciplinary research and its spreading to the European, Asian as well as the international scientific and entrepreneurial community.

The cross-cultural and cross regional focus of the Virtual Institute will synthesise, consolidate and further develop the synergy of knowledge of IST innovations and their applications to knowledge based economy, entrepreneurial innovations and new forms of enterprise and learning systems.
MODELS OF CROSS-CULTURAL COLLABORATION

Section II: A Synthesis Report

EU-INDIA Cross-Cultural Innovation Network

This unique collaborative project nucleated an Innovation Network between European and Indian universities and research institutes, and is funded by The EU-India Economic Cross-Cultural Programme. Set in the context human centred research tradition, the network focuses on the value added applications of university research into the areas of social and economic change, regional models of innovation and entrepreneurship, and their transferability between regions and cultures.

The EU-India innovation network, consisting of 9 partners, 5 from the EU and 4 from India, is itself seen as innovation in creating a complex web of cross-cultural and cross-regional linkages. The EU partners represent five countries and diverse regions: Aachen (Germany); Lyngby (Denmark), Bologna (Italy), Brighton (UK) and UWCN (Wales). The Indian partners, PAU (Punjab), GLS (Gujarat), DU (Delhi) and NISTADS (Delhi), represent three diverse regions: Punjab, the home of ‘Green Revolution’, Gujarat, the ‘entrepreneurial hub’, and Delhi, the ‘connecting hub’ of India.

What this project has achieved is that at the institutional level the project partners have successfully created a network framework for research into the applications and impact of ICT and multimedia in socio-economic development (rural areas) and entrepreneurial (small and micro-enterprise, artisanal) sectors. At the bilateral institutional level, the partners have formed collaborations in the development of action research models in the dairy sector, and cluster models of innovation. In the field education, postgraduate courses in IT and ICT, multimedia tools for entrepreneurial training, and IT supported self-learning tools for collaborative learning have been implemented. At the individual level, the project has created new opportunities for network researchers to work in cross-cultural and trans-disciplinary environments. At the EU-India cooperation level, the project has made a major contribution to the understanding of the richness of cultural traditions of research, entrepreneurship and innovation. This network framework has opened up new and some times unexpected possibilities of working across cultural and
regional boundaries, and how to break away from the traditional mono-cultural, mono-disciplinary, and techno-centric model of research.

We have learnt about new dimensions of cross-cultural collaboration during this networking journey. Our experiences of creating, evolving and sustaining this complex network, have given us valuable insights into the working and functioning of cross-cultural collaborative environments. Some of key lessons which could be beneficial for future collaborations in cross-cultural settings are: the need for partners to own the project at early stages of its implementation; to build experience of inter-institutional, inter-regional collaborations; to create spaces for articulating cross-cultural experiences in research writing; to avoid too rigid a definition of cross-cultural and trans-disciplinary projects; and to be aware of the formal limitations imposed by the rigidity of funding structures. The project should be built on both the individual interests and institutional contexts, cultivating both big and little pictures, but defining project activities in terms of achievable objectives; recognising the need to evolve mechanism for professional recognition, being aware of institutional value of effective publicity, and the need for the Coordination Centre to act as catalyst for sustained innovation.

Building on our experiences, we believe that there is a strong case for a medium/long term programme of strategic cross-cultural and trans-disciplinary research building upon technological innovations and Asia’s huge pool of tacit knowledge and creative enterprise. There is an urgent need for policy makers in both continents to develop a research framework programme, which promotes networks of research communities functioning across institutions and regions of Asia.

We believe that our effective contribution to this strategy would be to continue to build on the foundations of the EU-India Innovation Network project. Our proposed virtual network is an effective way of developing a new action-oriented framework for shaping new technology for socio-economic innovation, particularly for sustainable rural development.

Network Partnership

The EU-India Cross-cultural Innovation Network project is collaboration between European Universities (Brighton; UWCN Wales; Aachen, Germany; IpL Bologna Italy;
and DTU Lyngby Denmark) and Indian universities (DU, Delhi; NISTADS, Delhi; PAU, Punjab; and GLS, Gujarat). The overall coordination of the project activities were undertaken by the project coordinator, University of Brighton, and networking management of Indian partners is undertaken by the India Coordination Centre, University of Delhi South Campus. The project is concerned with the fostering of proactive collaborations in applied research in socio-economic and entrepreneurial innovations through academic and entrepreneurial networking, including joint inter-university postgraduate and doctoral training programme, involving universities and entrepreneurs in the EU and India. The project is rooted in a commitment to human centred systems approaches in science and technology and our belief that the establishment of a direct relationship between university and socio-economic applications is central to the fostering of proactive entrepreneurial and innovation cultures. The central aim of this cross-cultural collaboration is to make a sustainable contribution to the EC-India cooperation on the transfer, exchange of cultural models of innovation and entrepreneurship, especially their transferability between and across regions and cultures both within India and the EU.

Innovation refers here to new attempts to bridge the gap between the university and the entrepreneurial world. This gap relates to the tension between the propositional knowledge of the university and the tacit knowledge of the user, as well as the tension between local and global perceptions of technology. We believe that any sustainable collaboration between the EU and Indian universities involves the enrichment of cooperation in applied research, knowledge and know-how, and central to this is the role of academic and entrepreneurial innovations in stimulating social and economic change. This involves the development of new techniques of problem definition and new modes of joint working and collaboration. At the heart of this project is the creation of proactive and cross-disciplinary activities.

We recognise that any sustainable cooperation on cross-cultural innovation necessitates a deep understanding of the traditions of social, economic, industrial innovations, as well as of the operational mechanisms for the integration of new technology into enterprise cultures. By extending the university network to entrepreneurs and entrepreneurial organisations, and by integrating exchanges of researchers with the ongoing processes of joint R & D projects, joint seminars, workshops and network forums, the project has
provided an integrated model for university collaborations in applied research and postgraduate training.

One of the major objectives of the innovation network project is to develop a cross-cultural model of innovation and research, building upon the European models of regional innovation and action research in the industrial contexts and the Indian models of regional action research in the socio-economic context. Specifically, the programme is articulated through activities in following areas:

- Entrepreneurial innovation stream
- Production innovation stream
- ICT and Multimedia innovation stream

The Scope of the EU-India Innovation Network

The EU-India Innovation Network has established the foundation of a virtual institute (Institute without Walls), which provides a basis for long term sustainable cross-cultural collaboration. This Virtual institute for future academic and entrepreneurial collaboration is conceived here as an innovative form of knowledge networking feasible with new media through which future collaborations can be developed, promoted and sustained. This is achieved through building network alliances between universities, regional knowledge centres, and the enterprises of socio-economic innovation. The purpose is to pool the scientific knowledge base of the university and its expertise into broader cross-cultural knowledge base of network partners. This knowledge base supported by the human innovation network and mediated by multimedia technology networks provides a central elements of the virtual network.

Project Achievements and sustainability of the network

The project has evolved a set of principles of collaboration which have guided the achievement of networking objectives of the project. The sustainability of the network has been enhanced by:

- Increasing the visibility of Europe in India and of India in Europe through building long term links between the European and Indian universities, and developing new modes of collaborations between universities and between universities and
entrepreneurs. By extending the university network to entrepreneurs both within the EU and India, the project has developed a model for dynamic two-way collaborations for enhancing cross-cultural presence in the two continents. By building upon the ongoing collaboration of the European partners through European inter-university networks, and by extending the work of Indian partners on national and international projects, this project complements existing work in innovation, and thereby creates a synergy with application areas of common priority to both the EU and Indian partners.

- Integrating exchanges of researchers with the ongoing processes of joint R & D projects, joint seminars, workshops and network forums, the project has developed an integrated model for university collaborations in action research. Through exchanges of academic staff and students, joint publications, publicity and dissemination in journals, informal and electronic forums, public lectures, concertation forums and conferences, the project has widened the scope for cross-cultural economic cooperation.

- Enabling active and proactive participation of project partners from the EU and India, complementing diversity of geographical regions and promoting common vision of action research, the project not only has ensured cooperative involvement but has also built upon the valorisation of diversity of the university and entrepreneurial dimensions. This focus on diversities and their influence on the practical modes of entrepreneurship can contribute to widening our scientific understanding and practical know-how of cross-cultural innovation.

- The project innovations include cross-cultural processes of applied research, combining staff mobility with the dissemination activities of the project. Applied research is conceived here as providing training experiences and orientation of young researchers to work systematically together with experienced researchers on the practical impact of research results and the transfer of the practical knowledge from the entrepreneurs to the researchers too. The distributed coordination and integrated management structure has been developed in order to reflect the multidimensional nature of the project.

- By focusing on direct links between applied research and the productive sector, and on the role of new media in enabling such links, the project has developed new models of interaction between the university and entrepreneurs. By integrating the university dimension with related key areas of the entrepreneurial dimension, the
network provides a new media based framework for supporting multi-disciplinary applied research, new forms of links between universities and entrepreneurs, and new forms of learning and earning and support.

- By providing a knowledge resource for collaborative learning and knowledge transfer, thereby contributing to the sustainability of existing collaborations and providing new possibilities of practical cooperation between academics, entrepreneurs and social actors within cross-cultural environments.

Impact of the Project

The impact of the project can be viewed from a number of perspectives. The complexity of this project enables us to judge the impact both qualitatively and in terms of concrete achievement in applied research and postgraduate developments. Our comments here focus on the partners' experiences of evolving collaboration over the life of the project.

All the project partners met for the first time in September 1999 at the Brighton workshop. At this initial stage, many partners did not know each other as a group. They came from different cultural contexts, disciplinary backgrounds, institutional commitments, methods of working and aspirations. In this first network group meeting, however, the combination of formal, in formal, and intense interaction soon made us realise that despite different backgrounds we were still “like-minded” people. At a macro level we shared concerns for issues such as economic development based on diverse material, cultural and human resources and connecting innovations to the enhancement of skills and entrepreneurial capabilities of entrepreneurs, farmers and artisans. The issues were like basic ingredients available to chefs and the Brighton workshop turned out to be like an exercise of generating a menu of dishes the different chefs could prepare depending upon their own experience, capabilities and tastes.

At another level, before the Brighton workshop there was an uneasy feeling among some partners of not fully comprehending how exactly the partners are to collaborate. What joint actions will we take up and how? Most of Indian partners were familiar with projects where as principal investigators, they take individual responsibility to achieve a limited objective committed to the sponsoring agency. The Cross-Cultural Innovation Network project on the other hand involved multiple partners each in a certain sense being a principal investigator. How would individual project responsibilities evolve in a
collaborative mode amongst a group of principal investigators? Who would collaborate with whom? The project structure being different from the usual individual projects familiar to Indian partners, Indian partners shared these feeling of not fully ‘understanding’ the project.

The Brighton workshop was an important and necessary step not only in terms of getting to know each other but also for clearing some of these apprehensions. The workshop enabled partners to visualise a portfolio of specific aspects of innovations; aspects that appeared to be of common concerns and interests to both the European and Indian partners. Collaborative activities could thus be built upon these specific aspects; “Dishes” the partners could prepare during the course of the project.

Some of the specific aspects of European developments with significant implications on economic development excited Indian partners:

1. Combining artistic and cultural activities with Information and Communication Technology to create ‘cultural industry’ (Wales).
2. Creating an enterprise network of distributed production systems by a systematic approach to participation of stakeholders and using the University system as an important change agent in this area (Denmark, Aachen and Italy).
3. Extending Information and Communication Technology teaching and research in the Universities beyond the technical aspects of computer programming and technology to incorporate learning issues at the interface of human-machine interaction (Brighton & Aachen).
4. In general, the term ‘entrepreneur’ commonly understood in India to mean a person engaged in organised business or industry is also applicable to artisans and small farmers.

Some of the specific aspects of Indian developments with significant implications on research development excited European partners:

- Cooperative models of entrepreneurial innovation embedded in the Indian society especially the cooperative models of dairy enterprise in Punjab and Gujarat,
- ‘Rich pool of tacit knowledge’ inherent in the artisanal traditions and grassroot innovation movements of India, and which are not accessible in Europe
• The diversity of models of entrepreneurship in Indian regions, for example the individualistic entrepreneurial model of Punjab region and the cooperative family model of entrepreneurship of the Gujarat region
• ‘Kisan Mela’ model of networking of Punjabi farmers and the Punjab Agricultural University (PAU), as a model of community based participation and the catalyst of ‘Green Revolution’ in India
• the unfamiliar juxtaposition of emphasis on individual achievement in the academic learning environment in India with a strong tradition of mutual cooperation and support.

These presented considerable challenges to develop collaborative research and teaching programmes.

During the subsequent discussions, workshops, monitoring and coordination meetings in India and Europe, we saw the emergence of collaborative projects building around the research interests and regional contexts of partner institutions. The network approach enabled simultaneous launching of a number of ‘joint projects’ each with well defined ‘work packages’ and partners. For example:

1. Wales - NISTADS: ICT and Artisan enterprise
2. Lyngby - Bologna-NISTADS-PAU-GLS: Networking in Dairy enterprise
3. Aachen - NISTADS-GLS: Small Enterprise networks and industrial clusters
4. Aachen - DU: University –Industry interaction- a new curriculum development
5. Brighton - DU: ICT enabled learning
6. UWCN Wales - DU: Multimedia curriculum development
7. Brighton - PAU: Postgraduate IT course development

Significantly the network approach not only established a number of collaborative linkages between European and Indian institutions but also amongst the Indian institutions. One the significant achievements of this project is that it linked four universities from three Indian regions, Punjab, Gujarat and Delhi for the time, and stimulated networking and inter-institutional collaboration among the Indian partners which did not exist before this project started. It is worth noting the Indian partners feel that before this project, NISTADS, GLS, PAU and DU had not realised the potential of collaboration amongst themselves.
Impact on Indian Institutions

The information dissemination activities, involving students, faculty members and decision makers carried out throughout the course of the project has made a sustainable impact on the programmes of the participating institutions. Examples are:

A new Postgraduate IT Course at PAU. Collaboration between the project partners PAU and Brighton in the development of the first Postgraduate in IT course at the PAU is one of the major contributions of the EU-India Innovation Network. This is a significant development with important economic implications. Punjab’s economy is heavily depended on Agriculture. The PAU is one of the few Agricultural Universities in the country. It is recognised by the Government of Punjab State as the main player in the State’s agriculture and hence in its economic development. Introduction of IT in agriculture will have implications in not only the development of agriculture per se but will also open newer entrepreneurial avenues.

The initial phase of the development included the piloting of the IT and multimedia course modules with the academic and technical staff of the PAU with a purpose of
creating a pool of expertise for future training course for the extension and development workers of Punjab. The picture here shows academic staff of the PAU participating in the EU-India network workshop on IT and multimedia training.

Entrepreneurial Training centre at GLS
People in Gujarat, especially those engaged in small and medium enterprises, have traditionally relied on their family background for acquiring entrepreneurial skills. With growing international competition, that traditional mode had to be supplemented by formal training structures. The GLS in collaboration with Centre for Entrepreneurial Development (CED) has successfully implemented a new postgraduate entrepreneurial Training centre for training young entrepreneurs in Gujarat region. The evolution and establishment of this entrepreneurial centre was stimulated by the collaboration of GLS in the EU-Indian innovation network. The picture here shows senior researchers of the EU-India innovation network with entrepreneurs form Gujarat during their visit the to SMEs in the Ahmedabad region in December 2000.

In the picture, we see Network researchers (first row) Dr. V P Kharbanda (NISTADS), Dr. Rajinder Kaur Kalra (PAU), Dr. Kavita Mehra (NISTADS), Dr. Ashok Jain (DU), guest visitor from Venuzuela, Prof. Karamjit S Gill (Brighton), and then third from left Dr. Francesco Garibaldo (Bologna). Also in the picture we see Prof. Lauge Rasmussen of
Lyngby (second row in between Dr. Kalra and Dr. Mehra), and Dr H S Sekhon of PAU (second row in between Dr. Mehra and Dr. Jain).

Culture-Value addition to Artisanal Products, NISTADS
Collaboration between the network partners NISTADS and UWCN (Wales) in multimedia and cultural industry has contributed to the rethinking of the role of multimedia tools for e-commerce. By highlighting through multimedia presentation, the unique cultural dimension of artisanal products, the products acquire a higher market value.

This has encouraged the artisans in Bankura to aim for better economic returns on the strength of their cultural traditions.

This collaboration has added a new dimension to NISTADS engagement with the artisanal entrepreneurial development in the Bankura region of West Bengal. This multimedia collaboration between NISTADS and UWCN was stimulated by the participation of the project partners in the case study work on rural entrepreneurial innovation in the floricultural in and around the Delhi region.
The picture here shows EU-India network researcher Kavita Mehra (NISTADS), accompanied on her left by Dr. Jon Dron (Brighton) and David Smith (filming) of UWCN Wales, talking to one of the floriculture entrepreneurs in the Delhi floral market.

**ICT Teaching & research at Delhi University**
The Institute of Informatics and Communication at the University of Delhi South Campus prepared a forward-looking teaching and research profile incorporating areas of interdisciplinary ICT, Multimedia for Developmental Communication, ICT based learning etc. This has formed the basis of its next five-year plan programme for seeking support from the University Grants Commission of India. In addition the Institute adopted the ‘open source soft-ware’ approach.

**Launching of EU-India network Web Sites**
The development of the EU-India network project website created synergies with the launching of websites of the partner institutions in India. In the initial phases of the project, the network stimulated and facilitated the development of partner website. This
was to create a knowledge base for the project ‘virtual network’, a tool for sustainability and future EU-India collaborations.

In the picture the network researcher Jon Dron (Brighton) is illustrating the use of multimedia tools for web design to senior scientists of the PAU (sitting left to right), Dr. H S Sekhon (Agr. Engineering), Dr. G S Kalkat (then Vice Chancellor of PAU), and Prof. Ranjit Singh.

**Culture of e-communication**

Communicating with the network partners through e-mail strengthened the adoption of e-communication culture by the Indian partners.

**Extended impact**

Regular dialogue of the Network Coordinators and visiting European partners with the heads of Indian institutions during monitoring and review meetings and interaction with the academic faculty and postgraduate/doctoral students during the project workshops held in India had an extended the impact of the project at the regional, and national levels in India. For example:
A collaborative Higher Education Link project between PAU and Brighton supported by the British Council not only got formulated but also became operational.

A programme of exchange of farmers between Punjab and Denmark got initiated. An exchange training course on "Organic Farming and Strengthening democratic abilities and actions in organizations for key persons", sponsored by the Danish Ministry of Foreign Affairs, was organised and hosted by Baaring Folk High School, Denmark from 29th April to 22nd June, 2002. A delegation of seven progressive farmers belonging to different regions of Punjab participated in this course. The main theme of the course was organic farming, Andelsbevægelsen – Danish way of cooperation and the Folk High School, which aims at learning for the life. The objective of the visit was to learn new technologies related to organic farming and cooperative system including dairy, vegetable production and crop cultivation and to explore the possibilities of adapting it in their own situations and to act as a model for other Punjabi farmers. In the picture we see Punjabi farmers participating in one of unique and largest university- rural enterprise interaction forum, “Kisan Mela (Farmers Fair)” held every six months at the PAU.
At the Kisan Mela farmers have opportunity to participate in the forum discussions and also listen to the seminars and talks given by Agricultural scientist and development experts on issues ranging from impact of IT on farmers and rural communities, the impact of WTO on rural and farmer enterprises, innovations of new varieties of seeds, fruits and vegetables, the role of ‘Plant Clinic ’ as a research resource for diagnosing plant diseases, and a model of knowledge transfer from the university to the rural village communities, and transfer of tacit knowledge from farmers to the university,

The Chairman of the University Grants Commission (UGC) of India inaugurated a EU-India project workshop at the University of Delhi South Campus on the role of Universities in ICT education. For the new Chairman of the UGC, it was the first structured discussion on this issue. Subsequently the UGC went deeper into the issue and launched a major initiative in ICT, an area that otherwise had remained essentially confined to the public engineering institutions and privates institutions. The Principal Scientist of the EU-India project at DU was made a member of the concerned Committee of the UGC.
In the picture, we see Prof. Hari Gautam, the UGC Chairman (standing on the left) and Prof. Abhai Mansingh (standing on the right) talking to the Masters in ICT students at the Institute of IT and Communication of Delhi University. Inspired by ‘learning while earning experiments in India and Europe, Prof. Abhai Mansingh pioneered the first “learning while earning” initiative in a traditional Indian University.

- The project has extended its networking to researchers, entrepreneurs and NGOs actively involved in socio-economic innovations and rural development.

A large number of participants attending the project workshops started taking interest in the EU programmes. Summary of the ICT-Asia programme sent by the India coordinating Centre to those working in ICT triggered formulation of new collaborative projects.

**Our Approach**

Evolving an action-oriented participatory approach rooted in the human-centred tradition has been central to the success of the project. The key activities of the project, R&D in socio-economic innovation, IT innovation and postgraduate training, publicity and dissemination, virtual knowledge networking, were seen as an interconnected set of common actions both on functional and time scales. Senior researchers through the mechanism of exchange visits established university links through seminars, lectures, student supervision and joint publication activities, leading to the partner collaboration in postgraduate and doctoral training programmes, and IT and multimedia training programmes for postgraduate students, entrepreneurs and stakeholders in rural development. An information audit and joint pooling of applied research and innovation in partners institutions was used to facilitate collaborative R&D projects in the Indian and European regions. The R&D work and outcomes of collaborative activities of project researchers were consolidated in project workshops, contributing to preparation of material for joint publications and information dissemination, journal papers, project reports, Web pages, and a knowledge data base, thus creating and sustaining the virtual innovation network. Interaction through email groups, and internet supported collaboration contributed to joint working and team work of the project. The project activities including university networking, joint R&D projects, seminars, workshops,
public lectures, concertation forums and conferences were used to form new linkages with entrepreneurs and entrepreneurial organisations as well as extending the university network to other university and entrepreneurial networks. Workshops/seminars, concertation forums and the virtual network also provided larger diffusion of information to researchers, entrepreneurs and social partners outside the project network. The workshops were used as vehicles for internal and external evaluation of project activities. The future sustainability of the project has been assured by creating long-term links between partner institutions, bilateral collaboration between partner universities, networking of individual researchers, and networking of researchers, entrepreneurs and stake holders through the 'Virtual Innovation Network.' The EU-India Innovation Network has established a basis for long term sustainable collaboration supported by a virtual innovation network. The term innovation network is used here to describe the human knowledge networking supported by technology. The focus is on innovatory human activity especially in the creation of technological resources. The virtual network brings together two key components of the project: Human knowledge network resource, and Electronic information network resource. This development is centred around a dedicated project website, networked with partner website, and hyper-linked with appropriate websites and information resources.

The Innovation Network is conceived here as an innovative form of knowledge networking feasible with new media through which future collaborations can be developed, promoted and sustained. This is achieved through building network alliances between universities, regional knowledge centres, and the enterprises of socio-economic innovation. The purpose is to pool the scientific knowledge base of the university and its expertise into broader cross-cultural knowledge base of network partners.

**Key Outcomes of the Project**

The central focus of the networking project has been the development of an integrated framework of cross-cultural collaboration and integrated models of research and postgraduate training. In developing these models, we have integrated research and training activities into the networking activities, particularly project workshops, exchange visits of senior researchers, visibility events of the project, and the coordination and monitoring activities. This integrative approach is embedded in the articulation of the project outcomes:
A Cross-cultural Model of Collaborative Research and Entrepreneurial Innovation

One of the major objectives of the innovation network project was to develop a cross-cultural model of innovation and research, building upon the European models of regional innovation and practices of action research in the industrial contexts of European regions, and the models of regional action research in the socio-economic contexts of Indian regions. Initially three streams of innovation research were planned:

1. Entrepreneurial innovation stream
2. Production innovation stream
3. ICT and Multimedia innovation stream

Entrepreneurial Innovation stream consisted of Indian partners, PAU, GLS and NISTADS, and European partners, Lyngby and Bologna. The production innovation stream consisted on Indian partner GLS and NISTADS, and European partner, Aachen. The ICT and Multimedia stream consisted of Indian partners, DU and PAU and the European partners, Brighton, Wales and Aachen.

The R&D teams examined the models of regional innovation in the Emilio Romagna (Italy), and Danish regions of Europe, and Punjab and Gujarat regions of India. It emerged that both Indian and European partners have formed a common vision of regional innovation which involved the study of cooperative models of innovation in the dairy sector, the development of action research as a common methodology for collaboration, and the stimulation of entrepreneurial networking through case study work and workshop participation.

Based on the cross-cultural experiences of the production innovation stream gained through exchange visits, workshop participation and enterprise visits, it became clear that practical way forward for this stream was to focus on cluster models of innovation
through a process of case study visits of project researchers to enterprises in Gujarat and Punjab regions of India, and Aachen and Emilio Romagna regions of Europe, complemented by student case study work in the Gujarat region focusing on SMEs in the production sector.

Based on the experiences of developing and piloting ICT and multimedia training programmes at PAU and DU during the initial phase of the project, it was concluded that the most appropriate way forward for this stream was to develop three strands for further work, one on the development of multimedia tools for knowledge acquisition of artisans in the Bankura region of West Bengal, and the second on ICT education, and the third on ICT and rural development in Punjab. The knowledge acquisition strand became a collaborative activity between UWCN Wales and NISTADS, and the rural development strand involved DU, PAU and Brighton.

This experience of the R &D activities during the early phases of the project led to the reorganisation and redefinition of research activity in terms of work packages for the duration of the project. Each work package was allocated a project research team consisting of EU and India partners. Project workshops were used as intensive periods of R&D development and feedback process. In addition to the workshops, the case study/field work linked to R&D projects provided a forum for entrepreneurial networking. The role of the co-ordinating centres became crucial in facilitating partners to share and consolidate project R&D work. The R&D streams were reorganised as follows:

1. Action Research Group- Dairy Sector (PAU, NISTADS, IpL Bologna, DTU)
2. The Production Enterprise Cluster Research Group (GLS, NISTADS, Aachen, UWCN)
3. ICT & Multimedia Research Group (Brighton, DU, PAU, UWCN)

The main focus of the Action Research group was the development of models and methodology of action research in the dairy sector, models of enterprise innovation, and entrepreneurial networking. The focus of the Production Enterprise group was on the models of industrial clusters. The focus of the IT & Multimedia Research Group was three fold: ICT Education and Training Group was concerned with the development of models of ICT supported postgraduate education, and ICT tools for Self & Distance
Learning. The Multimedia Tool Design Group was concerned with the development of Multimedia tools for enterprise innovation and as research tools for knowledge acquisition and communication of tacit knowledge.

The models below (Fig. 1) gives an insight into the working of project partners in R&D projects, and also about the potential linkages between the Indian partners. The achievements of the R&D projects and their impact on the future research directions of participating institutions is summarised in terms of the academic research, applied research and application in education and training.

The entrepreneurial networking aspect of the R&D activities was closely linked to the interaction between the R&D research groups and their respective target groups. Thus the collaboration between the researchers and target groups also played a key role in cultivating relationship between the main domain of R &D activities and their target research groups. These relationships, illustrated in the table below, highlight the commonalties between the institutional focus, networking gaps and possibilities for future collaboration and institutional developments.

All the R&D streams involved the study of the models of entrepreneurial innovation, and practices of applied research within the European and Indian contexts. It identified regional and cultural models of innovation and entrepreneurship in the Bologna, Danish and Aachen regions of Europe, and in Indian regions of Punjab and Gujarat.

The common focus of the R &D research was on the development of a common methodology for R&D work, linking university research to the enterprise sector through collaborative case study/field work, networking of researchers and entrepreneurs through visits of senior researcher to enterprises, as well as, participation of entrepreneurs at the project workshop in different regions in India and Europe.

One of the key feature of the R&D collaboration was to act as a catalyst for the institutionalisation of this research culture through the involvement of senior academics and policy makers from the participation universities, as well as contributing to the building and enhancement of links between the participating universities and regional entrepreneurs.
The models below (Fig.1 & Fig.2) show the pattern of collaboration between Indian and European partners, as well as between Indian partners and between European partners. Partners are linked according to their collaboration in the R &D groups. The model gives an indication of the formation of new linkages among partners, building upon their EU-India collaborations.

Cross cultural model of R&D collaboration

![Diagram of R&D collaboration](image)

Fig 1: Linkages between R&D group: Dairy, Clusters, and ICT

- **Action Research Group- Dairy Sector** = ←→
- **The Production Enterprise Cluster Research Group** =  
- **IT & Multimedia Research Group** = ←→

NISTADS: National Institute of Science, Technology and Development Studies, Delhi  
PAU: Punjab Agricultural University, Ludhiana, Punjab  
GLS: GLS Institute of Business Management (Gujarat University), Ahmedabad, Gujarat  
DU: Delhi University South Campus, New Delhi  
IpL Bologna: Istituto per il Lavoro, Bologna, Italy  
DTU: Technology University of Denmark, Lyngby, Denmark  
UWCN: University of Wales College, Newport, Wales  
Aachen: University of Technology (RWTH), Aachen, Germany  
Brighton: University of Brighton, UK
Patterns of Partner Collaboration

The R&D relationships shown in the model (Fig. 1) above, are illustrated in the table below (Fig. 2) These highlight the commonalties between the institutional focus, networking gaps and possibilities for future collaboration and institutional developments.

<table>
<thead>
<tr>
<th>Institutional Focus</th>
<th>Conceptual Academic Research Target Group</th>
<th>Applied Research and Extension</th>
<th>Education and Training</th>
<th>Potential Collaborations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers / Dairy</td>
<td>NISTADS, IpL, DTU</td>
<td>PAU, GLS, IpL, DTU</td>
<td>PAU, DTU</td>
<td></td>
</tr>
<tr>
<td>Artisans</td>
<td>NISTADS, UWCN</td>
<td>NISTADS, UWCN</td>
<td>UWCN</td>
<td></td>
</tr>
<tr>
<td>SMEs</td>
<td>NISTADS, GLS, IpL, Aachen</td>
<td>GLS, IpL, Aachen</td>
<td>GLS, Aachen</td>
<td></td>
</tr>
<tr>
<td>Student researchers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>specialisation: Business Management</td>
<td>GLS</td>
<td>GLS</td>
<td>PAU &amp; GLS</td>
<td></td>
</tr>
<tr>
<td>ICT</td>
<td>DU, Brighton</td>
<td>Brighton</td>
<td>DU, PAU, Brighton</td>
<td>DU &amp; NISTADS, DU &amp; GLS, DU &amp; UWCN</td>
</tr>
<tr>
<td>Agriculture</td>
<td>PAU</td>
<td>PAU</td>
<td>PAU</td>
<td></td>
</tr>
</tbody>
</table>

Fig.2: The Table shows the institutional focus associated with the Indian partners (DU, GLS, PAU, NISTADS) and their collaborations with European partners (Brighton, UWCN Wales, Aachen, IpL Bologna, and DTU Lyngby) of EU-India Cross Cultural Innovation Network project.

R&D Collaborations: institutional focus, networking gaps and future possibilities

Research Domains
- The Conceptual academic research: It mainly involves identifying, evolving, framing and developing the concepts. The project partner, NISTADS with its focus of interdisciplinary research undertook the task of consolidating the academic research
of the Indian partners through its involvement in collaborative action research projects

- Applied research and extension: It is concerned with connecting research to field actions and interaction, and networking with stakeholders. For example, the PAU networking links with agro-industry entrepreneurs and farmers and with dairy industry through the extension work, and the GLS links with SMEs through management know how.

- Education and training: It is concerned with the development of new and the evolution of exiting ICT courses at postgraduate level and the innovation of training centres. For example, the development of ICT courses offered to graduate and post graduate students DU (Institute of Informatics and Communication in ICT), the development a new postgraduate IT course at the PAU (Agriculture Engineering) and IT training course for extension workers at PAU (Extension education), and the innovation of an enterprise training centre at GLS (Institute of Business Management) through its links with educational institutes and training centres.

The work of the partners was embedded in the research focus of their respective institutions. The project thus provided a scope for their own growth within the institutional context on one hand, and the other hand on the introduction of new innovative ideas in the institutional research, teaching and extension programmes. The outcome of the project was also a manifestation of the institutional research focus. For example, NISTADS mainly focusing on conceptual research, DU focusing on conceptual research and course design, PAU focusing on action research, ICT for extension and rural development, and GLS focusing on conceptual research, applied research and education and training.

Cross Cultural Linkages between Indian Institutes
During the period of cross-cultural collaboration, Indian institutes have also created intra institutional linkages. PAU formed a linkage with NISTADS in the dairy related action research. GLS and NISTADS created a linkage in SME clusters.

Potential Linkages and Collaborations
- The interdisciplinary linkages of DU in the area of ICT and extension programmes of PAU and GLS remained latent. NISTADS potential linkages with the education and
training programmes of PAU, GLS and DU also were not pursued. Introspecting the same, the reasons were:

- The non availability of researchers who could develop and implement such joint programmes and,

- As this was the first experience of cross-cultural collaboration for most Indian partners, they were not able to fully appreciate the potential and advantages of expanding cross-cultural linkages at this early development phase of the project collaboration

- Due to the mono-disciplinary institutional culture of university partners in India, inter-institution collaborations with partners from different disciplines was difficult to integrate in their educational and training programmes.

In summary, these partner collaborations provided a basis for the formulation of joint cross-cultural projects in action research, as well as models for the development of future cross-cultural and inter-regional projects proposals both within the Indian and the EU contexts. The network structure of these collaborations provides a framework for future network collaboration in cross-cultural innovation.

**A Network Model of Postgraduate Training: developing an integrated framework**

The objective the network model was to develop an integrated framework for postgraduate training in cross-cultural settings. It involved creation of an overarching framework, which integrated the network activities of postgraduate course development, R & D projects, work, the exchange of researches for the integration of the postgraduate and doctoral training programme into the postgraduate programmes of partner institutions (Fig.3). This involved the stimulating and facilitating the development of new Masters in IT course at Punjab Agricultural University (PAU), the expansion of the existing Masters in ICT course at Delhi University, and the creation of a Centred for Enterprise Training at the GLS, Ahmedabad. This model focuses on augmenting new courses into the existing academic structures of the partner university (e.g. PG in IT course at the PAU) or augmenting existing postgraduate courses, through new course/training modules (e.g. multimedia training and collaborative learning modules at Delhi University), or widening existing teaching and research through project seminars and invited lectures by senior network researches (e.g. MBA course at GLS). The
success of the innovation network has been in facilitating collaborations between India and European partners in postgraduate training. The successful collaborations include:

- PAU and Brighton collaboration- A new post-graduate course in IT;
- Delhi University and Brighton collaboration: ICT supported course and training modules in collaborative learning;
- Delhi University, PAU & UWCN, (Wales) and Aachen collaboration: Multimedia training;
- GLS, Brighton collaboration: Enterprise training.

These collaboration in postgraduate training together with Action Research work in the dairy sector, artisan sector and small enterprise sector form the core of the Doctoral and Postgraduate Student network.

The R & D work involved visits of postgraduate students from Brighton, Aachen and Denmark to India, and interaction between postgraduate and doctoral students during the workshop/seminar programme. In addition to PhD training through workshop and seminar programmes given by visiting senior researchers on exchange visits, the Network partners developed a model of joint PhD supervision through distance supervision.

Examples of PhD supervision collaborations are:

- PhD student at Brighton: Collaboration between Brighton, UWCN Wales, and Delhi
- Doctoral student at Aachen: Collaboration between Aachen and Delhi
- PhD student at Lyngby: Collaboration between Lyngby and IpL Bologna

Just as the R&D work of the project was an integral part of postgraduate training innovations, the development of innovative approaches to ICT education and the development of ICT support systems for entrepreneurial training, were central to the R&D programme.
Fig. 3

PAU: new Masters IT
Delhi: extension
Masters ICTs
Collaboration: Brighton, & Wales

Masters in IT
Training modules:
Multimedia
PAU & Delhi: new modules
Collaboration: Wales, Brighton
PAU, Delhi, GLS,
Brighton, Lyngby, Aachen, IpL, Wales

Doctoral & postgraduate students
Academic staff & young researchers
Delhi, PAU, GLS,
NISTADS, IpL, Brighton, Lyngby, Aachen, IpL, Wales

Exchange visits
Senior Researchers
& invited lecturers
Exchange of teaching and training experiences
PAU, new Masters IT

Workshops/seminars
Theories & methodologies of action research
Contextual research material
Exchanges of teaching experiences

Network partners
Home institutions

Validation & accreditation & implementation of courses and course modules
R & D: exchange of teaching and learning experiences
Exchanges of teaching and learning experiences

A network model of postgraduate training
The Description of the Framework Model

The model shown in Figure 3 gives an insight into the integrated network model of postgraduate training in the cross-cultural environment.

Single Platform for Interaction
The framework provided a single platform for interaction and collaboration for students and researchers from diverse academic and cultural backgrounds. Project workshops and seminars organised by both Indian and European partners provided a forum for interaction and communication among partners. The major communication flows can be divided in four parts:

- Institutional communication: Interaction and communication between partner institutions both within and across regions helped partners to undertake joint actions towards initiating new and strengthening existing collaborations: Examples are:
  - Within the region communication: Between PAU, GLS and NISTADS in the domain of Action Research
  - Across the region communication: Between DTU (Denmark), PAU (Punjab) in agriculture; Between Aachen (Germany) and GLS (Gujarat) in the domain of Enterprise Clusters
- Individual communication - this took place at various levels
- Within the Gujarat and Delhi regions: between senior researchers of GLS and NISTADS in the domain of enterprise clusters
- Across the cross-cultural regions of Germany and Gujarat: between senior and young researchers of Aachen, GLS, and NISTADS
- Within the regions of Punjab and Delhi: project researchers of PAU and NISTADS
- Within the same region: Between the postgraduate students and doctoral researcher and senior researcher: all partners
- Across the region doctoral students and project researchers: Brighton and Delhi
- Industry - University communication
- Within the region industry - university communication: all partners
- Across the region Industry - university communication: between PAU, GLS and NISTADS; between Lyngby and Bologna; between Wales and NISTADS; between PAU and Lyngby; between Aachen and NISTADS; between Brighton and PAU; between GLS and Aachen
- Doctoral student interaction in the inter-institutional settings
The joint supervision of students by partners from different countries helped the postgraduate students understand the dynamics of cross-cultural research environments. For example, a PhD student of DTU, Lyngby (Denmark) was also guided by IpL Bologna, Italy. This enabled him to integrate the cultural contexts into his study of the dairy enterprise system and the innovation cluster approaches in both the countries.

Flourishing of the inter institutional research collaboration
The integration of exchange visits of senior and invited lecturers in the postgraduate training model helped fostering the creation of inter-institutional research collaborations, within and across Indian and European institutions

Individual research collaboration
The in-built mechanism of interaction and exchange in the model also facilitated collaboration between individual researchers within and across the regions. The model created links between young researchers and senior network researchers through specialist lectures, seminars, and open forums, and this led to the exchange of knowledge and experiences of research. This exchange also helped the young researchers to build networking collaborations with other young researchers both within and outside the project network.

Multidisciplinary approach
Based on these network collaborations at the institutional and individual levels, new multidisciplinary courses were developed for the first time in the Indian university patterns. For example the postgraduate IT course at PAU is oriented towards the Agriculture sector in Punjab. The multimedia training tool development at NISTADS is directed at the artisanal enterprise sector. The ICT Masters course development at Delhi University integrates in its design and operational mechanism an innovation of “learning while learning” model.

- The model facilitated a network approach of research and course development, as well as the development of supporting network structures of co-ordination and management

The multidisciplinary approach of the model enabled creative ways of exploring new areas of research. For example the model provided a forum for Indian and European researchers to develop methodologies of action research and enterprise cluster innovation, building upon the European research traditions and Indian research
practices. The model also provided a basis for developing an integrated approach of piloting course modules and peer evaluation, and a forum for the preparation of contextual material for Masters course in IT at PAU and ICT Maters course at DU. It is worth noting that this cross-cultural collaboration in the development and piloting of interdisciplinary Masters courses in IT and ICT was a new departure from the academic rigid traditions of India.

- The models enhances the visibility of the Individual and the institution at the global level

This integrated network approach enabled project researchers and partner institutions to gain recognition of their work and research traditions at the individual, institutional, regional, national and global levels. The network structure of the postgraduate model provides a basis for publications and dissemination of research by bringing together research resources of senior researchers, academics, and postgraduate and doctoral students. Project partners also organised workshops and seminars to gain visibility of their research at the national and international levels. These visibility events made a valuable contribution to the collaborative working of the network and the transfer of knowledge between the partner institutions and among individual researchers.

- New direction of the research

This fundamentally new approach towards learning, teaching and collaboration led us to develop new direction of research which will enhance future collaborations by involving young researchers, senior researchers, academics and entrepreneurs from outside the partner network. We propose to develop a virtual institute of cross-cultural innovation which will facilitate new and extend existing collaboration between the EU and Indian partners.

The network model of postgraduate training has also facilitated the cultivation of collaborations in strategic research planning.

**The Building Blocks of the Network Model of Postgraduate Training**

Building a mechanism and creating a process a post-graduate and doctoral training programme.
The project used the mechanism of exchange visits to create collaboration between the senior academic and teaching staff from the home university in India.
Senior academics from the partner institutions in Europe, collaborated in the design, piloting and evaluation of postgraduate training programmes for the home university students.

This involved the preparation of workshop/seminar and lecture modules, preparation of contextual and reference materials, as well as the preparation of the multimedia resources and tools for self and distance learning, including the production of pilot multimedia material.

The programme also included the development of the internet supported interaction, web supported contextual material, video films and CD Roms as learning resource tools. Publication of journal papers, workshop presentations, and project reports formed a central component of the contextual and reference material for the training programme.

The collaborative R & D projects, seminars/workshops and the visits of senior academic staff were used as a vehicle for developing material for post-graduate training programmes. Joint R&D projects provided a practical framework for training of post-graduate students in undertaking case study work linked to action research projects. The project workshop provided a forum for training students in presentation of their project work, as well as learning about the process and methodology of peer evaluation.

As an integral part of the network model of postgraduate training, the exchange of senior researchers was designed to involve the following roles:

- Undertaking training and supervision of postgraduate and doctoral students;
- Giving tutorial, lectures and seminars
- Acting as a catalyst in developing and reinforcing links with the senior academic and administrative staff concerned with postgraduate development at the home institution.

The project workshops and seminars acted as forums for the exchange of experiences in the design and implementation of postgraduate training in IT and multimedia, as well as the developing of computing science training course at Indian universities. This led to rethinking of postgraduate training in IT in India from a traditional engineering based training to a wider interdisciplinary oriented development, building upon the British experiences at Brighton and UWCN Wales. The unique university-industry model of
postgraduate training established at Aachen made a significant contribution to the rethinking of ICT training model at Delhi University. The “earning while learning” model of professional postgraduate programme at Brighton proved to be catalyst and exemplar to pilot an “earning while learning” component as part of the ICT Masters course at Delhi University.

Situating the evolution of the Postgraduate Model

The Network has made a major contribution to the development of IT education in India at postgraduate level. At the PAU, the network has facilitated the development of a new Masters course in IT programme, and has supported the further development of an existing Masters programme in Information and Communication Technologies at Delhi University. New modules in IT have been developed and implemented at the PAU. Training modules in IT and Multimedia have been developed and implemented at the Delhi University and the PAU. The network has been a catalyst for the establishment of a new Centre of Enterprise Innovation at GLS, Gujarat. At Aachen, IpL Bologna, Lyngby, and Wales, the network has stimulated new directions of action research, which has led to the development of a cross-cultural context for doctoral training and joint research project both within and across Indian and European universities.

These postgraduate developments in IT, multimedia, enterprise innovation and doctoral networking, began as a result of the project planning meetings in India held at the PAU, GLS, NISTADS, and Delhi in March 1999. Indian partners identified their postgraduate training needs in the areas of information technology and multimedia. The project network set up the process and procedures for stimulating collaboration in postgraduate education between Indian and European partners. In the initial phases of the project, the mechanism of the exchange visits of senior researchers together with the workshop/seminar programme was used to first develop course material for training modules, followed by the piloting and implementation of these modules through a special lecture and seminar programme.

In addition, the project has stimulated the development of websites in India, with all our Indian partners, PAU, NISTADS, Delhi (IIC) and GLS, launching new web sites. This has created a learning and teaching resource for postgraduate training as well as knowledge resource for doctoral students and researchers. For example a collaboration between Delhi University and Brighton in the area of self learning is based upon the use
of website as a tool for collaborative learning between IT postgraduate students at these universities. This is already leading to major research collaboration in the area of self and distance learning both at postgraduate and doctoral levels.

**IT and multimedia training modules at the PAU**

The new Postgraduate Diploma in IT (Masters level) course was launched at the PAU in July 2000. The EU partners, Brighton and Wales have made a major contribution to develop new skills and teaching expertise at the PAU in the emerging areas of IT and Multimedia. A number of IT course modules already established at Brighton within the British context, were adapted to the Indian context for implementation at the PAU. A course module in multimedia training being run at UWCN Wales was modified and piloted at the PAU as a training tool for academic, postgraduate students and technical staff. Senior researchers from Brighton collaborated with PAU academic staff in the development and implementation of the PG IT course. Traditionally the PG course programmes in IT in Indian universities have been rooted in the engineering disciplines, and the entry to postgraduate IT courses in India is limited to students with background in engineering and science subjects.

This new course provided a departure from this engineering focus to an inter-disciplinary focus by linking the computing science programme with the extension education, humanities, and business studies programmes at the PAU. This interdisciplinary approach to IT training has contributed to the development of new areas of IT skills and expertise at the PAU, which are necessary for interdisciplinary applications in the agricultural society such as Punjab. This training course at the PAU has also gone a considerable way to achieving the objective of developing a core expertise of academic staff as trainers in IT and multimedia. These expertise will provide a new skill pool for IT training of extension workers, development workers, as well as, rural entrepreneurs in Punjab.
In the picture, we see EU-Indian Network senior researcher, David Smith of UWCN, Wales (standing on the left) in conversation with workshop participants during the training session on multimedia tools at the PAU.

The course has already provided a model for a new initiative in IT for rural development, a collaboration between Brighton and PAU, supported by the British Council, Delhi, thus contributing to extension of the EU-India collaboration as well as to the long term sustainability of these development sat the PAU.

**ICT Masters of Science at University of Delhi**

This ICT Masters course developed by the Institute of Information and Communication Technology (IIC), Delhi University, is aimed at creating software and communication hardware professionals for IT industry in India. The Network partners supported DU in developing a new area of postgraduate training in multimedia and IT applications in socio-economic areas, thereby stimulating the extension of IT education at DU towards a broader interdisciplinary approach both in content and structure. The mechanism and the process of postgraduate training in multimedia tools piloted at the PAU was adapted
for Delhi University, thereby laying the basis of the transfer of training models from Europe to the Indian context, as well as, transfer within the Indian context. The development and piloting of IT and multimedia modules at DU was implemented through the project workshop and seminar programme organised at Delhi University during the exchange visits of senior researchers from Wales, Brighton and Aachen. Thus project partners contributed to widening the scope of the existing ICT course, as well as, contributing to the enhanced employment opportunities for students in the new application areas of multimedia and IT design. This collaboration between DU and EU partners is contributing to the development of new areas of research in collaborative learning, collaborative working and distance learning. In the picture we see Masters in ICT students working in the ICT Lab. of the IIC during the EU-India training workshop on IT and multimedia tools.

**Multimedia Training Development at Delhi University**
This collaboration brings multimedia expertise of University of Wales and ICT practitioners of Delhi University together to develop training courses for students, researchers and entrepreneurs in multimedia. A course document and pilot training material was prepared and implemented through short training courses at Delhi University. A model now exists for University wide multimedia training at Delhi University as well as a basis for future collaboration in this area between Wales and Delhi.

**Distance Learning and collaboration: Delhi University and Brighton Collaboration**
This collaboration between DU and Brighton builds upon the PhD research on Internet supported self-learning tool design at University of Brighton and ICT supported human-centred learning model being developed at Delhi University. In the picture, we see (sitting from right) Dr. Jon Dron (Brighton), Dr. Sanjeev Singh (Delhi University), and Ms Rajapillai (PhD Student, Brighton), in a discussion on the development of self-learning tools and collaborating learning environments.
Central to this collaboration between Brighton and Delhi is the research into cross-cultural communication in collaborative learning environment, the topic of Rajapillai’s doctoral research.

These ICT tool supported learning innovations are brought together for developing and implementing a common distance learning programme for postgraduate students at Delhi and Brighton. This involves software and multimedia tool development, web-based course materials, research into human-computer interface design, and developments into open systems learning environments.

“Learning while earning” model
The very idea of transfer of knowledge and exchange of experiences between University research and enterprise application was about promoting and cultivating the models of “learning while earning”. The project work contributes to this model through:
The developing of workshop based (one week or two-week) intensive training course modules as a model for postgraduate training for future students who learn while working.

This model was based on Brighton’s experience of module based postgraduate training for students in employment. In this model students attend one-week intensive course at Brighton mainly during the vacation periods or in the pre-time-tabled weekly course modules. The course consists of one week teaching modules at the University, course work at home, and case study and project work linked to the students’ employment.

This “learning while earning model” provided a new context for the development of such models at the Indian Universities. Delhi University is first among Indian Universities to take steps in implementing such a model. Bright students from poor families who cannot afford course fees for IT course at Delhi University are admitted to the course on the basis that they earn their fees through working as administrators and support staff in the IT labs. Delhi University is planning to extend this model to students who may work part-time in IT companies in Delhi area, and to students who may do extra software work within the University for IT industry.
This emerging “learning while earning” model being developed at Delhi University will provide a bench mark for similar models of learning and earning at other universities in India.

MBA at GLS, Gujarat University
The lecturers and seminars given by senior project researchers to the MBA students of GLS on topics, such as Information Society and Globalization, IT and entrepreneurial innovation. Science and society, European models of knowledge networking, human-centered paradigm, have contributed to widening the horizon of the MBA course within the context of inter-dependent globalization.
In the picture, we see postgraduate and doctoral students participating in the EU-India Network workshop on “Enterprise Innovation in Knowledge Society” on held at GLS. Through the project workshop, seminar and lecture programme, the project partners have made significant contribution to the extension of the MBA course at GLS in the following respects:

- Adding a new dimension of European models of entrepreneurship and innovation to the MBA programme.
- Refocussing the study of innovation at GLS to cross-cultural perspectives from the rather traditional ways of thinking and praxis
- Broadening the course horizon to broader societal and cultural aspects in the field of Economics and Business Management
- Creating opportunity for the exchange of knowledge and experiences of research and postgraduate studies at the partner Institutions
- Providing a new perspectives on Gujarat Models of innovations within cross-cultural settings

**Enterprise innovation Training Course at GLS**

Collaboration between GLS and project partners Brighton, NISTADS, and Aachen contributed to development of this unique mentor based network model of training of unemployed graduates and postgraduate into entrepreneurship. The training model involving GLS teaching staff (as tutors); GLS MBA students (as case study
collaborators), local entrepreneurs (as mentors), and policy makers (as support network resource) provides a network model for ICT supported entrepreneurial training.

This training model for unemployed graduate and postgraduates provides a unique exemplar for its transfer to other regions in India especially Punjab, as well as developing regions in Europe. In the picture, we see SME entrepreneurs from regions of Gujarat, participating in the EU-India Network workshop on “partners in collaboration” held at GLS as part of the Network workshop and seminar programme.

A Network Model for Doctoral Training

One of the objectives of the network model of postgraduate training was to set up a doctoral network, initially of doctoral students and young researchers studying at partner institutions. The purpose of this network was to create a mechanism of joint PhD supervision which involves collaboration between the home supervisor and the visiting senior researcher in the supervision process, as well as, the use of project workshops for initiating joint R & D projects as a practical framework for training of doctoral students and young researchers in project work, and project seminars as training forum for the presentation and assessment of the work of doctoral researchers. In the picture, we see doctoral students participating in a seminar programme at Aachen University.
In the centre standing is Dr. Dietrich Brandt, project partner from University of Technology (RWTH), Aachen.

In addition to PhD training through workshops and seminar programmes given by visiting senior researchers on exchange visits, the Network partners have developed a model of joint PhD supervision through distance interaction. Examples of PhD are:

- PhD student (Brighton): collaboration between Brighton, Wales, Delhi
- Doctoral student (Aachen): collaboration between Aachen and Delhi
- PhD student (Lyngby): Collaboration between Lyngby and IpL Bologna
In the picture we see doctoral students Paurav Shukla (on a research visit to Brighton from GLS) and Ms Rajapillai (Brighton), in discussion with project research officer, Ms Tania Funston (Brighton).

This doctoral group together with doctoral students from Aachen and Lyngby has been actively involved in the development of virtual doctoral network, as an integral part of the project PhD training model. The model of PhD training developed by the network is based on the following factors and activities:

- The student is registered for PhD at the home University
- An arrangement for joint supervision (main supervisor at the home university) and collaborative supervisors (at partner university)
- Joint case study/field work by the PhD student supervised by the collaborating partners
- The case study work may form a part of credit contribution/transfer by the students in line with the credit transfer mechanism of the home university
- Project partners provide research opportunities to partner students through workshops, seminar programmes, and case study visits
• Distance supervision and research support is provided by partners through email communication, web-based resource support and where appropriate telephone interviews
• Joint research reports and research publications

These collaborations in postgraduate education and training and their contextual activities have formed the basis of the development the network model for postgraduate training. It builds upon the process of the transfer of training modules within the network, the linking of the project and partner websites, the use of the internet as a virtual tool for self and distance learning.

The workshop/seminar programme is used as a mechanism for the piloting and evaluation of course modules, the exchange visits of senior researchers as a catalyst and expertise resource for the initiation and development of new courses and course modules at partners universities, and the use of project R &D work as a vehicle for student case study and field work. This postgraduate development has contributed to the building of the visibility of the project in the academic and entrepreneurial sectors both in India and Europe.

A Network Model of Project Visibility

We have found the network visibility in the form of public forums and public conferences as an effective way of linking the project with the wider community of researchers, students, entrepreneurs, members of local community, regional policy makers and media. We describe here some key visibility events, which we have organised in Europe and India during the life of this project.

PAU Launching the EU-India Innovation Network Project in India, March 1999

Being at the heart of ‘Green Revolution’ In India, PAU was the natural location to launch the project in India in March 1999, at a Public Symposium on "From Agriculture to Industrial Society in the Global Information Economy" held at the PAU, Ludhiana.
In the picture, Dr. G S Kalkat the then Vice-Chancellor of PAU (sitting in the middle), receiving the EU-India Network delegates (sitting from Left) Prof. Dhaval Mehta (GLS), Dr. (Aachen), Dr. Ashok Jain (DU), Dr. H S Sekhon (PAU), and then third on the right form Dr. Kalkat, are David Smith (UWCN, Wales), Prof. Lauge Rasmussen (Lyngby) and Dr. Ranjit Singh (PAU), and Director of Postgraduate Studies at the PAU.

Participants included academics and university staff, together with invited entrepreneurs, members of the public from the City of Ludhiana, and media both local and regional – newspapers, radio and television. The symposium provided a forum for introducing the project to the PAU and local community, and familiarising project partners especially the European partners to the “Green Revolution” innovation culture of the Punjab region, and the unique role of PAU as the university of the whole Punjab state and its farmers, with its network of extension education and research centres. The project partners took to the heart the ‘Kisan Mela’ (Farmers Fair) as a unique participatory model of networking of the PAU and Punjabi farmers, and a model for information sharing and knowledge transfer. The proceedings of the Forum were widely publicised throughout the Punjab region, by both local and regional newspapers (English, Punjab and Hindi), as well as extensive coverage was given by Punjab radio and television. It was the beginning of a very active and stimulating partnership between PAU and project partners from India and Europe, which later led to the development and implementation of the first postgraduate IT course at the PAU oriented towards the applications of IT for rural
development, IT and multimedia training for the Punjabi farmers, and a network collaboration on action research in the dairy sector, with a special focus on women dairy cooperatives as a vehicle for women empowerment. The Forum laid the foundation for sustainable networking of Indian and European partners, and provided a network resource base for a new Higher Education Link in IT and rural development between University of Brighton and PAU supported by the British Council, and collaboration in organic farming between Punjab and Denmark supported initially by the Danish Ministry of Foreign Affairs.

**Brighton inaugurates the EU-India Innovation Network Project, Sep 1999**

The Networking Coordination partner, the University of Brighton inaugurated the EU-India Innovation Network at an international conference on "Enterprise Cultures and Innovation in the Information Society", and International Workshop/Seminar on "Collaboration in Innovation", held University of Brighton on 13-17 September 1999.

The Mayor of Brighton opened the conference and hosted a civic reception for conference delegates.
In the picture we see Cllr. Jenny Langston, the Mayor of the City of Brighton and Hove (in the centre) flanked by (standing from the left) Prof. Mike Cooley (the then Chairman
of the EU-India Economic Cooperation programme), Dr. Ashok Jain, India Network Coordinator (DU), Mr. Roberto Carpano. (then Manager of the Management Agency of the EU-India Programme), Prof. Karamjit S Gill, Network Coordinator / project Director, and Professor Sir David Watson, the Vice-Chancellor, University of Brighton. The conference audience represented a wide cross-section of the Brighton community, academics, researchers from several universities, entrepreneurs from local and regional enterprises, media, and community groups such as the Sussex Exclusion Forum, Brighton Unemployed Centre, Lewes District Council, EMMAEUS, and local Poets Corners Resident’s Society.

The conference provided a forum for network partners to engage in human-centred collaborative research in cross-cultural environments, building university and entrepreneurial networking, creating opportunities to exchange information on innovation models at regional and international levels. Exploring the nature of cross-cultural collaboration the forum highlighted the regional traditions of India and Europe – the individual and directed cooperative models of Punjabi enterprise, the grassroot and family models of enterprise and innovation of Gujarat, Social innovation models of Britain, and enterprise cluster models and cooperative innovation models of Italy, Germany and Denmark.

The role of the EU-India network was seen in terms of facilitating links and collaborations between Indian regions as well as across Indian and European regions.
In the picture above on the left, we see (sitting from left to right, Prof. Mike Cooley, Mr. Prof. Karamjit S Gill and Prof. Gordon (then Dean of IT Faculty, University of Brighton) responding to the forum discussion. In the picture below, we see (facing the camera, Dr. Balakrishnan and Prof. Dhaval Mehta (both from GLS, Ahmedabad) in dialogue during the forum discussion.
The purpose was to develop a conceptual framework and models for cross-cultural cooperation, and mechanism and tools for knowledge networking and for dissemination of entrepreneurial innovations at cross cultural and regional levels both within India and across India and Europe by creating new forms of collaborations between university and the enterprise.

The event brought many of the European and Indian network partners together in participatory forum for the first time. The partners were also introduced to the scope of the EU-India Economic Cross-Cultural programme, emphasising its priority to create mutual understanding between people of diverse cultures and continents. It provided an opportunity for project partners to recognise and appreciate the significance of the cross-cultural nature of the project network in terms its cultural, regional and inter-disciplinary dimensions. The event provided a forum for the development of an operational framework for implementing project objectives through its R&D, workshops, exchange and networking activities. At the heart of project activities was the creation of knowledge networking of cross-cultural innovation – a virtual institute of innovation.

Both the conference and the workshop events created a foundational framework for cross-cultural collaborations and future directions of research.
UWCN hosts a Workshop on Multimedia and Cultural Industries, Sep 1999

Following the Brighton event, UWCN hosted a workshop/open forum on multimedia and cultural industries. Participants included Members of academic staff from Art & Design, Business School, IT, Engineering, Continuing Education, Administration and International Relations, senior researchers and research staff of the EU-India Network project. The delegates were welcomed by the Vice-Principal of UWCN. The discussion included an insight into the EU & India Dimensions of the EU-India Innovation Network project, and possibilities of UWCN- India collaboration. It provided opportunity to introduce participants to the academic and research developments at UWCN and the international dimension, the identification of the scope of academic collaboration of partners with UWCN in Multimedia, Business & Management, the Identification of Community and entrepreneurial networks. The project workshop also focused on the collaboration of UWCN in postgraduate training developments in multimedia as well as role of multimedia and cultural industries. This event laid the foundation of a very significant collaboration between UWCN and NISTADS in the area of multimedia tools and artisanal enterprise and innovation in the Bankura region of West Bengal.

Aachen extends the EU-India network to World Engineers Convention, June 2000

A public forum on the Knowledge networking and Sustainable Development was organised by the project partner, Aachen University as an integral part of the 7th IFAC Symposium on “Automated Systems Based on Human Skill – Joint Design of Technology and Organisation” held at Aachen, Germany, June 15-17, 2000. Participation (over 100) included senior academics and entrepreneurs, and local and regional organisations. The project partners were introduced the unique university-enterprise networking environment of Aachen and the inter-cultural tradition of Aachen region intersecting three countries, Germany, the Netherlands and Belgium.
In the picture we see (standing from the right) Dr. Dietrich Brandt (Aachen) in conversation with Dr. Ashok Jain (back to the camera) and Sune Netterstroem (PhD student from project partner Lyngby) during the break from the forum the workshop discussions.

The World Engineers Convention held in Hannover on 19-21 June 2000 was strongly influenced by the work of the EU-India group. The Sub-Congress on Information and Communication within the Convention was attended by, around 800 participants from all over the world. It was organised by the Aachen team of the EU-India project. Hence the concepts put forward by the EU-India group found their way directly into the main plenary contributions as well as into the Memorandum and the Web-based Discussion Forum. The main papers presented at the convention were revised for publication in the AI &Society journal. The web-based Discussion Forum was extended after the Convention for further discussion of the most controversial issues.

Both events are considered by their organisers, as specific innovative learning experiences for all participants.

GLS promotes models of innovation and entrepreneurship, July & December 2000

As Punjab is known as the heart of Green Revolution in India, Gujarat is known as the Entrepreneurial hub of India. GLS hosted its first ever international conference/workshop on “Enterprise Innovation in Knowledge Society” in December 2000,
The conference was inaugurated by His Excellency Shri Sundar Singh Bhandari, Governor, Gujarat State. The conference was followed by a network workshop on "Entrepreneurship in the Global World".

The forum brought together researchers, practitioners, entrepreneurs, NGOs, local community, media and business associations together in one of the major events of the EU-India project.

During the event GLS also inaugurated the new auditorium in the very Gujarati tradition.
In the picture, we see Prof. Karamjit S Gill, Coordinator of the EU-India Network, cutting the ceremonial ribbon during the opening ceremony of the auditorium. On the right standing is Mr. Nanavati, Chairman of the GLS. The auditorium was completed just in time for the EU-India event.

The conference/workshop event was attended by project researchers from India and Europe, Invited speakers, invited audience- academics, students from different faculties, local community, entrepreneurs, policy makers, and media (approx. 700 participants). The President of Small Industries Federation and representatives of Small-scale Industries Association, heads of all GLS Institutions, Faculty and PG students.

In the picture below, we see Prof. Stuart Laing (Pro Vice-Chancellor, University of Brighton) receiving a bouquet of flowers from a postgraduate student of GLS in the very Gujarati tradition of presenting a bouquet of flowers to guest speakers, during the workshop session of the conference, held in the newly inaugurated auditorium.
The workshop provided a forum for interaction between project partners, members of the Gujarat research community and entrepreneurs from Gujarat. It highlighted the visionary family model of Gujarat’s entrepreneurship, European innovation dimensions, the centrality of diversity of cultures and complementarity of interests of enterprises, issues of empowerment, entrepreneurship, export-import and economic development.

By visiting the small-scale organisations ideology of the enterprise clusters and family model of Gujarat became clear to the researchers. The workshop provided a stimulating forum for Government policies, entry and exit barriers for enterprises, financial support system to compete in the changed scenario and guidelines for collaborating in the international arena.
By visiting the Amul Dairy at Anand, the researchers from Europe and other parts of India were able to appreciate the essence of the legendary Gujarat dairy co-operative movement.
In the picture, we see Prof. Kurian, the pioneer of the “Green Revolution” in India receiving EU-Indian Network researcher at the AMUL Postgraduate Institute.

The workshop illuminated the spirit of collaborative movement in the dairy sector between European and Indian partners with a new focus of Action research. The workshop was extensively covered by the newspapers, and Television.

This workshop event was preceded by a special entrepreneurial event organised by GLS on July 5, 2000, bringing together researchers, entrepreneurs from a number of small scale industries associations in and around Ahmedabad as well as faculty members and counselors of GLS. The event provided a forum for identifying the potential for industry-academia partnership.

This event was followed later by the foundation and the inauguration of a unique center for enterprise development, GLS-CED Center for entrepreneurship, research, training, and counseling on 9 September 2000. The event also celebrated the partnership of GLS in the EU-India Cross-Cultural Innovation Network. All leading newspapers of Gujarat covered this gala event and the inauguration ceremony.

**EU Commissioner Franz Fischler Visits Project Partner, PAU, April 2001**

Mr. Franz Fischler, European Commissioner for Agriculture, Rural Development & Fisheries together with Mr Caillout, Head of EU Delegation in Delhi, and a high powered delegation of the EU visited Punjab Agricultural University on 18 April 2001. The EU Commissioner held a special meeting with the Minister of Finance, the Minister of Agriculture and Animal Husbandry, the Chief Secretary of the Punjab Government, and other senior officers of the state Government.

Seen in the picture below are (sitting from Left to right), the Minister of Agriculture and Animal Husbandry (Punjab), Dr. K S Aulakh, the Vice Chancellor of PAU, with the Minister of Finance (Punjab), and Mr. Franz Fischler, European Commissioner.
Senior officers of Punjab Agricultural University and progressive farmers also participated in this meeting.

The Commissioner held a round table meeting with the participants and gave a public lecture on the EU-India cooperation. He also addressed the faculty and students of the University and other invited guests.
Participants also included representatives of the EU Delegation, Delhi, representatives of the Indian Government, senior academics, administrators, researchers, teachers and postgraduate students of the PAU, Ministers and secretaries of Punjab Government, Regional and local entrepreneurs, Media, Village farmers and agro-industrialists.

The Commissioner and other members of the delegation visited the village of Bilga, in the Ludhiana region of Punjab to meet the village farmers and learn about the impact of WTO on farming communities in Punjab, and inform them of opportunities and possibilities for cooperation and networking between Punjabi and European farmers.

The visitors recognised the significance of the EU-India Cross-Cultural programme in building bridges and facilitating cooperation between European and Indian universities, enterprises and media. It provided a forum for the identification and articulation of future collaboration between EU and India in the agricultural sector, as well as the identification of new entrepreneurial links between Panjab and the EU.

**Bologna hosts workshop on Dairy Sector Enterprise Innovation, May 2001**

After the successful international conference at GLS in India, the R &D groups participated in a European workshop on Enterprise Innovations in Dairy sector held at Bologna in May 01. Partners presented case studies of dairy industry in Punjab and Gujarat regions of India, and European regions of Italy and Denmark. The workshop provided a forum for sharing knowledge and experiences of the dairy enterprises in India and Europe, recognising the role of action research methodology as a tool in facilitating active participation of stakeholders and building collaborations in cross-cultural research environments.

It became clear that India’s family model of co-operation and Europe's systemic approach of collaboration, illustrate the ways in which the dairy enterprise can grow and be sustained.
In the picture, we see on network partners, Prof. Lauge Rasmussen and Dr. Francesco Garibaldo (standing on the right) in conversation with a research visitor from Germany during the Bologna workshop. The workshop participants recognised the strength and relevance of the Emilio-Romagna regional model of enterprise and innovation, and thereby the need to transfer these innovative models in the cross-cultural environments. The partners agreed to develop a cross-cultural model of research and innovation, building upon the Danish experience in organic farming, Italian experience in cooperative enterprise, Punjab experience of regional dairy enterprise and women dairy cooperatives.

The workshop included visits to the Italian enterprises in the Emilio Romagna Region, including “CENTURIA” Science and Technological Park (CSTP), Cesena, the Consortium - ‘Apofruit’ in the agriculture sector in Cesena, the Consortium Arcobaleno Lavori, Ravenna, and the organic dairy “Caseificio Santa Rita” in Serra Mazzoni, MO. The organic dairy was seen as an exemplar of the family based dairy cooperatives in the Emilio Romagna region, linked to the network structure of the regional dairy enterprise,
as well as an exemplar of how ‘learning by doing’ can be used as a major tool to transmit tacit knowledge from generation to generation.

Workshop participants visited the Regional Government office in Bologna and had a meeting with Mrs Angela Bastico – Regional Alderman for Education and Labour to explore regional co-operation. Different models of innovation from European regions Aachen and Bologna, and Indian region of Gujarat, were highlighted as exemplars of increased spin off from the university to enterprise. Future possibilities of collaboration in the field of research and training between Emilio Romagna regions and India were explored, including the exchange of scholars in the fields of food processing and information technology.

The workshop highlighted how transfer of technology has been taking place from universities to SMEs in Italy, facilitating the diffusion of knowledge from universities to enterprises in the form of technology and know-how, both in India and Italy. The project R &D work was presented at the IV th International Conference “The Culture of the Artificial”, held at Urbino on 25-27 May, 2001 (picture on the right)
Delhi University South Campus holds an Indo-European Workshop on ICT for Sustainable Network Societies, December 2001

Participants at this event included project partners, senior researchers, faculty and postgraduate /doctoral students, senior executives of IT enterprises.
Software and multimedia companies, entrepreneurs of IT and rural development, representatives of the Indian Government and regional agencies in IT and communication development, representatives of the Ministries of S&T and of Information Technology of India, Media people, and representatives of the EU Delegation in Delhi.

The workshop provided a forum for discussion and dialogue on:
- The role of ICT and multimedia tools in rural development and networking of universities, IT enterprises and rural development agencies
- Indian initiatives in “Village Kiosks” and innovation in rural ICTs- their role in employment creation, enterprise innovation and regeneration
- Information Society Technologies (IST) programme of the EU and future collaborations with Indian partners
- Opportunities and possibilities of EU-India collaboration in EU-Asia programmes such as the Asia-ICT, and the Asia Link Programmes.

NISTADS organises an International workshop on Action Research in Dairy Industry and Woman Empowerment, February 2002

To consolidate the R &D work in the dairy sector, the project organised a five day workshop at NISTADS, Delhi in February 2002. The focus of the workshop was to develop action research methodology building upon the European methodologies of Search conference and Scenario building. The participants included dairy farmers, researchers, academics, policy makers, entrepreneurs, dairy managers as well as NGOs from Indian regions of Punjab, Gujarat and Delhi, and project partners from Denmark and Italy. The workshop developed a future vision for the dairy sector in India by involving participants in developing scenarios and action plans for community building, women participation in the dairy sector in India, especially women empowerment through building women dairy cooperatives. The village Panchayat representatives (village councillors) from the Indian state of Bihar on a visit to a NGO centre, the Centre for Social research, New Delhi.
In the picture we see the Network Coordinator, Prof. Karamjit S Gill (standing on the left) with Dr. Rajana Kumari (sitting in the centre), Director, Centre for Social research, New Delhi, during a discussion on the role of EU-India collaboration on rural development and women empowerment.

The scenarios projected were snapshots, normative and addressed qualitative features of the future of dairy sector. Each plenary session was followed by group work. The Delhi region emphasised the role of dairy in social life of people and community building. The Punjab region identified the concept of spark plugs as a catalyst of innovation at the grass root level in making Punjab change from the dairy co-operatives as a movement to becoming a focused business enterprise. The Gujarat region emphasised the role of Gujarat business enterprise culture in pioneering the dairy sector as a global business, and lesson for other region of India. The workshop provide an insight in the role search conference and scenario building methodologies in envisioning cross-cultural environments for innovation of the dairy sector as future entrepreneurial business, building upon the dairy cooperative movements of Gujarat and Punjab.
Principles of Cross-cultural Collaboration- a synthesis

Based on our experiences of networking of project partners, and the coordination and monitoring of project activities, we have formulated a set of principles of cross-cultural sustainability collaboration. These principles are intertwined with the lessons we have learnt from the implementation of this complex network project. We articulate here some of the key lessons and principles of sustainable collaboration, which we think may be of strategic operational value to others involved in or seeking to launch cross-cultural collaborations.

Lessons for Cross-cultural collaboration

Network partners have gone through a stimulating learning experience of new dimensions of collaboration in the complex cross-cultural environment of this project. Our experiences of creating, evolving and sustaining this complex network, have given us valuable insights into the working and functioning of cross-cultural collaborative environments. Some of key lessons which could be beneficial for future collaborations in cross-cultural settings are articulated here.

L1: Need for partners to own the project at early stages of its implementation

The network should ensure that project partners start owning the project and its activities from the early stages of implementation. In this complex EU-India project of regional and cultural diversities, as well as, interdisciplinary diversity, it took almost a year for partners to realise the potential and possibilities of long term collaborations. However, once the project had created a mutual understanding of cross-cultural collaboration, Indian partners became enthusiastic about the process and outcomes and got actively engaged in the ownership, For example, Delhi University in the development of Master in ICT course: PAU in the design and implementation of Postgraduate in IT course, and in the IT applications for rural development; GLS in the establishment of an Entrepreneur Innovation Centre, and NISTADS in the application of multimedia tools for artisans training (Bankura project). In the case of EU partners, the focus mainly remained on individual ownership and general sensibility of cross-cultural collaboration within the established institutional research traditions. This enabled EU researchers to initiate new directions of research in their own institutions and to stimulate new collaborative research within Europe and also between India and Europe, Examples include collaboration between Brighton and PAU (IT training); between Lyngby and PAU
(organic farming) and between UWCN (Wales) and NISTADS (Delhi) in multimedia and artisans. From our collaboration over the life of this project, it has become clear to us that the structure and organisational culture of Indian universities do not allow innovation at the individual levels and this inhibits their engagement in innovative activity. What is so impressive, however, is that a large minority of Indian researchers are still willing to initiate innovatory actions, despite being aware of the difficulties imposed by the Indian university structures. Our conclusion is that it is by networking of individual researchers we facilitate institutionalisation of innovation, and thereby the creation of environments for sustainable collaboration.

L2: Need to build experience of inter-institutional, inter-regional collaboration among Indian universities

Our experience of collaboration is that although Indian partners were successful in creating new postgraduate courses and new directions of research within their own institutions, inter-institutional collaboration among Indian partners was very limited. On the other hand, collaboration between European partners took place both at individual and institutional levels, because of their experience of working together over an extended period, while Indian partner never worked together in the past and in fact did not know each other before joining this cross-cultural project. Our conclusion is that European collaboration has evolved over a span of 10-15 years of working together under the aegis of strategic collaborative programmes supported by the European Commission. Indian researchers and Indian institutions may have to go through a similar process of sponsored collaboration experience before it would be possible to sustain effective cross-cultural cooperation and Inter-institutional and inter-regional collaboration in India.

L3: Need to Create spaces for articulating cross-cultural experiences in research writing

At the individual level, the experience of participation has been very positive and has led to a valuable reflection. It is important to define project objectives in such a way that there are spaces for sharing and reflecting on personal experiences as well as formal reporting. It was felt that the impact or contribution of Indian experiences is not adequately reflected or articulated in the writings or project reports of European partners. This apparent separation of cross-cultural experiences may be explained in terms of the way in which project tasks were approached by European and Indian partners. Although
European partners responded personally to Indian experiences and their impact on formulating future research and collaborations, they saw cross-cultural collaboration in terms of transfer of European educational experiences and research methods, thereby separating their own Indian subjective experiences from their formal report writings. Perhaps the lesson for coordinators is to create an expectation that project partners will create spaces for articulating and responding to cultural experiences in their writings.

L4: Need to avoid too rigid a definition of cross-cultural and trans-disciplinary projects
There is a need in projects such as this one to negotiate shared meaning. It is therefore important to provide space and time for this negotiation by delaying formal definition of project parameters. Our experience of collaboration has shown that by starting with the conceptual and rather overarching description of the project, enough space and time is available to individuals to get to know each other personally, to build a network of like minded people with a common purpose, and to create a facilitating environment for sustainable partnerships and institutional impact. It also enables the network coordinator to identify interests, expertise and competencies of individuals and partner institutions relevant to project activities and research themes, thereby leading to the effective concrete definition of various phases of the project and its products.

L5: Need to be aware of the formal limitations imposed by the rigidity of funding structures
Funds should be directed to project activities rather than allocated to individual institutions. Where as the EU partners have had considerable experience of the complexity and rigidity of European funding rules, this was a new cultural experience for Indian partners. In cross-cultural collaborations the project coordinators and partners should be aware of the potential negative synergy between the very rigid financial/accountability system of Indian institutions and the EC funding structure. There is a very real risk that these will work together to make flexible adaptation to changing circumstance almost impossible to make. Funding should be managed in a central pool rather than allocated to individual institutions; and should be used to support activities rather than the personnel. The coordinators have to recognise the asymmetry between the Indian institutional norms and funding terminology used by the EC. We should also be aware that the notion of the equality of funding advocated by the EC, may become a hindrance. We found that project partners, especially Indian partners saw funding as the only yard stick of equality, separated from the technical equality as the funding was seen
as the only criteria for evaluation, rather than focusing on the technical contribution as the evaluation criteria it should have been.

L6: Need to build the project on both the individual interests and institutional contexts
The strength of this project is that it started and remained mainly as a network of individuals, and this facilitated very effective collaborations at the personal levels. Because of this personal development, it maximised institutional impact. It is our experience that in India, bottom up innovations are very difficult and top down developments are rather slow. Engaging the interest of the committed individuals and supporting the development of their profiles within their institutions proved to be an effective strategy.

L7: Need to cultivate both big and little pictures, but project activities should have limited objectives to achieve
Our experience is that proverbial advice “to think global and act local” is as valid here as any where else. It is necessary while keeping the overall picture in mind, that specific activities need to be very effectively targeted. We made the mistake on some occasions of attempting to satisfy too many objectives at the same event, and consequently sometimes seemed to lose specific focus. For example, some workshops and exchange visits were loaded with too many objectives during the same activity. A workshop could be simultaneously the forum for students (second level) participation, entrepreneurial networking, visibility events, R &D presentations, and course developments in addition to extension of the network. This was generally managed without problems, but could still be rather confusing.

L8: Need to evolve mechanism for professional recognition
There is a need to recognise that the contributions of individual researchers are understood within the contexts of both the project and within their Institutions. In cross-disciplinary projects of this kind, it is important to cultivate a working environment in which the professional development of the individual is not prejudiced by working outside the conventional disciplinary boundaries. This is essentially a personal development issue and requires the constant cultivation of senior academics and policy makers to ensure their understanding of the project for personal development and institutional status.
L9: Need to be aware institutional value of effective publicity
The network coordinators should never lose sight of the positive impact of the visibility of the project on the commitment of participating institutions. This project has been very effective in maintaining a very high profile for the both the project and collaborating institutions, as well as, that of the EU-India Cross-Cultural Cooperation Programme.

L10: Need for the Coordination Centre to act as catalyst for sustained innovation
The role of the coordinator should be to act as an animateur and catalyst for sustained innovation and a sense of progression. The financial management should be separated from technical management. There is need to define and evolve the project sufficiently flexibly to allow the coordinator room to manoeuvre. This allows the coordinator to be effective in strengthening network collaboration and the continuous development of the project.

Principles of Sustainable Collaboration
One of the key challenges of this cross-cultural collaboration was to develop future sustainability through the creation of long-term links between universities, entrepreneurs and the civic society. We believe that any sustainable cross-cultural collaboration necessitates a deep understanding of the social, economic, and cultural environments of project partners, as well as, of the operational mechanisms for the integration of new technology into the enterprise and society. Based on the reflections of our experiences of this strategic collaboration, we have developed a set of principles of sustainability for future cross-cultural collaborations.

Network Approach
- Original network as a catalyst for multiplier effect
- Creating and building new networks, evolving or adapting the existing network

Principle of Change Process: Message for institutions
- Facilitating networking of individuals embedded in the institutions
- Developing models for institutional Change
- Capacity Building
- Facilitating self development of individuals within the institutional contexts
Process of Monitoring:
Focus on the dimensions of the way the project is monitored and evaluated
Cultivating and extending links
Individual growth, group working and network collaboration
Institutional change through Involvement of senior academics and policy makers
Coordinators as proactive catalyst for involving civic society and other stakeholders

Principle of visibility
- Projecting the project to wider research community and the civic society
- Positive impact of visibility on the commitment of participating institutions
- Creating new links and enhancing interactions at the individual and institutional Levels

Principle of equality and distributed involvement
- How to institutionalise the principle of equality, for example, by spreading and promoting the collaborative models through the institutions
- How to institutionalise change and sustainability?
- How to create a new institution?

Coordination as Principle of distributed equality
- Role of the coordinator as an integral part of the network coordination model
- Separation of technical and financial mechanisms and processes
- Distributive process of technical activities, but centralised mechanism of funding distribution

Principle of movement
- Feedback as a natural process of contribution and collaboration
- Feedback from new network to existing networks
- How the collaboration process transforms into a movement and obligation: from looseness to connectedness

Developmental Perspective
- Commitment to Human Centred Systems approaches
• Social and cultural shaping of technology
• Valorisation of diversity, facilitating networking of like-minded people.
Future Directions of Cross-cultural collaboration in Research

Brighton hosts a seminar on Future Directions of Human Centred Systems Research, July 2001

The origins of this EU-India network collaboration lie in the International Workshops on Human Centred Systems held in Brighton in 1989 which provided a forum for widening the human-centred debate from its industrial cultural roots to the cross-cultural dimension, building upon the human-centred concepts of the ‘human-machine symbiosis, tacit dimension of knowledge and ‘valorisation of diversity’.

This 1989 forum thus provided the foundation for extending the human-centred research collaboration with Japanese universities in the early 1990s. It was this collaboration between Europe and Japan which was to provide a vehicle set up the EU-Indian Cross-Cultural Innovation Network Project between EU and Indian universities. Building on our experiences of cross-cultural collaboration between Europe and Japan, an international workshop in Human-centred Systems was organised at NISTADS in Delhi in 1991.

The 1991 workshop explored possibilities and opportunities of a Europe-India collaboration in human-centred systems research, focusing on sustainable development.
The occasion provided an opportunity to discuss the relevance of the European human-centred systems research initiatives, such as the ‘Anthropocentric Systems and Technology, ‘Knowledge, Skill and Artificial Intelligence’, and their relevance to the building of research collaborations between Europe and India. These two European initiatives with focus on skill, tacit knowledge, networking of distributed small production units etc, though not often discussed or known in India, were seen very relevant not only for NISTADS work but for India as a whole.

The idea of organising this first such workshop on human-centred systems in India in 1991, was inspired by the late Dr. Manmohan Singh, the former Chairman, Indian Chamber of Commerce and Industry ; and Prof. Ghosh, the then Deputy Chairman of the Planning Commission of India. Both of them felt that human-centred movement was as relevant to the shaping of science and technology for the needs and aspiration for rural India, as it was for Europe. NISTADS being the premier social science research institute in India, was proposed as the most appropriate venue for sowing the seeds of future EU-India collaboration.
In the picture above, we see workshop participants and among them, we see (standing from right to left, facing the camera), Dr. Manmohan Singh, and third from him on the right is Prof. Karamjit S Gill (University of Brighton), the EU-India Innovation Network Coordinator, and David Smith (back to the camera), EU-India project partner from UWCN Wales.

In the picture above, David Smith in conversation with Mr Bhagwan Singh Danewalia (former Chief, Punjab Police) who played a key role in networking us with some of the key players in India, and emphasised the need for an EU-Panjab collaboration especially in the area of enterprise building in the agriculture sector. Dr. Ashok Jain, (then Director of NISTADS), India Network Coordinator of the Innovation Network, facilitated the organisation of the work and helped create an environment for future research collaboration between European and Indian universities, building upon diverse and rich heritage of the ‘tacit knowledge’ embedded in cooperative, community and grassroot movements of India and the research networking and social cohesion traditions of Europe.
In the picture at the reception given by the Director of NISTADS to workshop delegates from Europe and Japan, we see (sitting from left right), Dr. Ashok Jain and Dr. Partha Banerjee (NISTADS), Prof. Nuki (Musashi University, Japan), and standing (from left to right) are Prof. Yuji Masuda (Tokyo University), Prof. Karamjit S Gill (University of Brighton), Dr. Sushma Jain (JUN, Delhi), and standing behind her is David Smith (UWCN, Wales), Dr. , and Prof. Fumihiko Satofuka (then at Masami Women University, Tokyo). At that stage in 1991, there already existed a very stimulating and active research collaboration in human-centred systems between European and Japanese universities, supported by the European Commission programme in Anthropocentric Systems and Technology (APS)

It is against this sensitivity to issues of human-centred systems that the contours of the proposed EU-India Cross Cultural Innovation project were discussed, when Professor Karamjit S Gill (University of Brighton), met Dr. Ashok Jain (then Director of NISTADS) in NISTADS again in 1996 during the preparation of the project proposal. During the discussions, it was recognised that there existed for Indian partners an excellent opportunity of initiating collaboration with Europe through those intimately connected with these innovative initiatives. To Indian partners especially NISTADS, the project proposal on Cross-Cultural Innovation was all the more attractive as the usual channels of India-Europe collaborations were mostly tight jacketed into one or the other area of Science, Technology, Culture or Commerce providing little scope for collaboration in the
important area of connecting innovations to the enhancement of skills and entrepreneurial capabilities amongst small scale production and artisan production units. We realised that there were other like-minded people not only in European universities but also within Indian universities. The challenge was to create a nucleus of such “like-minded” people both in India and in Europe concerned with economic development based on diverse material, cultural and human resources, a nucleus that could sustain a fruitful Indo-European collaboration. The network approach of the EU-Indian Innovation Network Project proposal involving the Universities appeared ideally suited to address this challenge; the Universities being the training ground for future innovators, entrepreneurs and leaders.

Building on these interactions between Indian and European researchers, the EU-India Innovation Network project was launched in October 1998, and its full implementation in India began in October 1999. At the end of its four year life, the EU-India project has established sustainable collaborations between Indian and European partners, and has developed a cross-cultural framework for future collaboration at the individual, institutional and EU-India cooperation levels. Central to this framework are the development of models of cross-cultural collaboration, based on the experiences of network partner and their reflection.

Setting an Agenda for Future Directions of cross-cultural collaboration

Just as the European human-centred systems debate stimulated the launch of the EU-India project, the cross-cultural network brought to the focus wider cross-cultural dimensions of international collaboration, socio-economic innovation and enterprise, sustainable development, and knowledge society. While human-centred systems has been perceived in Europe as a corrective measure of industrial production systems, Indian research community sees human-centred systems as a future-oriented tool for building learning communities engaged in diversity of cultures and cultural practices, and facilitating proactive social enterprise and sustainable development. This developmental perspective provides a broader cross-cultural horizon to debates on sustainability such as social sustainability, economic sustainability, cultural sustainability, and environmental sustainability. Thus the Cross-Cultural Innovation Network project has not only widened the scope of human-centred research, it has also developed a networking
framework of cross-cultural collaboration, intersecting regional boundaries and overlapping cultural diversities.

To discuss the future directions of human-centred system research in the emerging knowledge economy, senior researchers from two networks, the Cross-Cultural Innovation Network and the European Human-centred systems network, came together in a joint forum in Brighton in July 2001.

In the picture we see some of the participants at this Brighton forum, who were also present at an historical International workshop held at University of Brighton in September 1988.
Sitting from left are Prof. Mike Cooley, Prof. Howard Rosenbrock, Prof. Rajesh Kochhar, David Smith and (standing) Prof. Karamjit S Gill, in discussion at the 2001 Brighton forum. The forum reflected on research challenges arising from concerns such as the limitations of the ‘one best way’ of causal science, the trap of determinism, problematics of synchronisation, the un-natural science, technical legitimacy of globalisation, IST and inter-generational solidarity, ICTs and Valued addedness global economy, Information Society of inter-connected relationships. The forum concluded with the need for a new direction of research which builds upon together the human-centred research tradition of Europe, and the grassroot traditions of regional and cultural of Asia especially India. It was proposed to produce a strategy ‘white paper’ on future directions of research into knowledge, culture and innovation - a framework paper for setting up of a "virtual institute for cross-cultural innovation".
In the picture we see Mike Cooley in dialogue with Ashok Jain, observed by H S Sekhon and David Smith. This network institute will create a human-centred framework and collaborative mechanisms with the purpose of enhancing innovation capacities, value creation and cooperative performance of researchers, entrepreneurs and civic stakeholders, by mobilising universities, enterprises and regional knowledge centres into a trans-disciplinary networking for research within the cross-cultural settings. The purpose is to open up new possibilities in research with a special focus on Information Society Technologies (IST) innovations and their applications in socio-economic and entrepreneurial innovations including rural development. This network taking a human-centred approach will develop new models and establish links of cross-cultural collaboration and innovation. By creating synergy through building links between centres of knowledge and innovation in Europe, Asia, and internationally, the network will extend excellence in knowledge, culture and innovation.
Setting a Context for Future Cross-Cultural Collaboration

Networks of Science and Technology in India: The Elite and The Subaltern Streams
(AI & Society, Springer-Verlag, Vol. 16.1/2
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Summary
The paper investigates the structure and functioning of the Science and Technology (S&T) system in India as it has evolved in the post-independence period (1947 onwards). The networks of entities involved in S&T actions, the paper argues, can be categorised, in terms of adopted approaches to agenda and priority setting and accounting for actions, in two streams. The origins and expansion of the two streams is traced. One the ‘Elite’ stream (high profile and visibility linked to big industry) adopting what the paper has generically termed as the ‘Nehruvian’ model of development is shown to have emerged as a dominant network. The other socially powerful ‘Subaltern’ stream (less visible, closer to ground realities and linked to village and cottage industry) adopting the ‘Gandhian’ model of development still remains dispersed and outside the consideration of high level decision making bodies. The paper stresses the importance of moving the support and attention from the dominant stream to efforts that attempt a synthesis between the dominant and the subaltern.

In India a discourse on macro purposes in the media and other public forums (proxies for articulations by society) usually takes place in terms of the divisions in which the Government articulates the country’s socio-economic development agenda. Science and more generally Science and Technology (S&T) being a distinct category of socio-economic purpose, S&T Innovation Networks (STINs) become an identifiable set of networks. The society perceives these networks working for social and economic change through S&T activities.

The S&T system in India has gradually grown into two streams. One stream connects the established and institutionalised S&T capabilities to organised industry through entities embedded in a culture generally projected as modern and closer to the practices prevailing in industrialised economies. This stream that is dominant has acquired the character of an elite STIN.

The other stream that we call the ‘subaltern’ stream consists of entities that are dispersed and connect S&T capabilities of smaller groups to distributed and unorganised
production units; the term subaltern is adopted from writings on the history of colonialism in India. Entities in this stream are embedded in culture that is sensitive to local community practices. Interconnections between the entities of this stream however are not yet strong enough to be considered as constituting an innovation network. We indicate the possibility of forming a more comprehensive national STIN through synergy between the two streams. It is recognised that the human centred systems movement originating in Europe and the EU-India Cross Cultural Innovation Network project is also concerned with the issue of synergy between the two.

From Field to Table
Presented at the “Enterprise Cultures and Innovation in the Information Society”
University of Brighton, 13-17 Sept. 1999
Lauge Rasmussen
The Technical University of Denmark
and
Francesco Garibaldo
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Summary
The concept ‘from field to table’ has been launched by researchers in the 1980’s as well as by the Danish Agricultural Center in the 1990’s. The decision to focus on the food-chain as such –rather than on any single link of it or any single technology- was taken because horizontal and vertical networking became of growing importance as an aspect of the increasing integration and product differentiation of the units within the food-chain. In order to study the architecture of networking for instance in the dairy sector in different cultural settings the total perspective ‘from field to table’ seems to be the most promising approach.

Cross-cultural studies of innovation in agriculture and industry tend to treat culture as a set of independent, external variables explaining observations which seem to be inexplicable from a purely utilitarian point of view The term culture has been used to interpret systems of innovations as corporate culture, economic culture or industrial culture. The concept of corporate culture is mainly concerned with intra-organisational attributes which influence the motivation and thereby the efficiency and creativity of the employees in that organisation. But corporate culture literature has tended to ignore the cultural-historical circumstances that allow some companies to flourish more than
others. Because the concept of corporate culture is so focused on the internal life of the company, it tends to overestimate the ease with which techniques and organisational behaviour can be transplanted from one cultural context to another.

Due to its analytical as well as practical intentions and comparative nature, the outcome of a cross-cultural study of the dairy sector should be useful to all the partners for catching new ideas and good practices. The methodology of the studies must take into consideration how academic as well as entrepreneurial perspectives can be satisfied as an ongoing process of mutual knowledge exchange, development and dissemination. The participants of such comparative, cross-cultural studies may gain inspiration from various action research traditions already established in the different cultural settings. Action research is here not to be considered as an alternative to conventional research approaches of innovations, but merely as a supplement that enables the entrepreneurs and the academics to be in a position of mutual knowledge exchange, rather than the more conventional ‘one-way’ knowledge dissemination from researchers to entrepreneurs. One of the most promising trends of the ongoing scientific discussion on innovation has been to shift the focus from purely technological aspects to various actors’ behaviour in relation to innovation processes. At the same time it is possible to observe a growing interest to study the specific and cumulative character which makes these processes somewhat rooted to the context in which they take place. Along this line, an innovation should be studied as a change of the cultural setting of the innovating unit, rather than something occurring within that innovating unit only.

This proportion has operational implications: The field of innovation and network studies has to be extended in order to include not only the actors directly involved in the innovative process, but also the way in which the innovative unit itself considers and is related to the agents, who provide, or could provide to it, the knowledge and/or commodity inputs as well as its interactive links with the units which are potential or actual customers. Separation between technical and institutional factors may be useful for analytical purposes, but they need to be combined in the end. Cross-cultural, comparative studies may turn out to be a promising approach to do so, if cultural settings are considered not only as conditions for innovations but also as part of the innovative process itself. Looking across various cultural settings may provide an opportunity to focus on particular cultural bounded aspects of innovation as well as more global tendencies of modernisation taking place all over the world.
Future Directions in Post-Graduate and Doctoral Research
(Presentation made at the conference on enterprise innovation in the knowledge society, GLS, Ahmedabad, 13 Dec. 2000)

Stuart Laing
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Summary
There are five routes to a doctoral degree all of which are now operating or are planned in Great Britain, and which have a place in the future development of doctoral work. These five are: (i) the traditional PhD, (ii) PhD by publication, (iii) PhD with integrated study, (iv) the practice-based PhD in Art, and Design and Performing Arts and (v) Professional Doctorates.

The Traditional PhD
The ‘traditional’ PhD in Britain is an individual research enquiry culminating in a single thesis. I would like to draw attention to two points about its apparent simplicity and uniformity.

First, the nature of the research reported in the final thesis can be very diverse. Different disciplinary families have very different methodologies of enquiry. This degree of diversity indicates why the search for a single common research definition and methodology has much less value than the development of mutual understanding and respect for the range of forms of intellectual enquiry which we need, and which doctoral degrees should reflect.

Secondly, over the past two decades a debate has developed in Britain about the fundamental purpose of the traditional PhD. The main criterion for success as a PhD candidate remains the making of an original contribution to knowledge. However increasingly since the early 1980s the British Research Councils, the main funders of British PhD students, have demanded that the PhD also provides a form of research training, equipping those who undertake it for a career in academic, scientific or industrial research. While these two aims can be combined there is also a potential conflict between the demand to focus in depth on one specific topic and the requirement for a breadth of understanding of all the research methodologies which a particular discipline or professional field requires.
PhD by publication
In this route an experienced researcher (from a university or elsewhere) may present for examination a collection of already published work of sufficient quantity, quality, coherence and originality. This is typically accompanied by an overview introduction (of, perhaps, 5,000 words) and a conclusion which together contextualise and explain the scientific contribution of the overall portfolio. Examination will, as with the traditional PhD, include a viva voce with an internal and an external examiner, since a key issue here is to establish (particularly in the case of jointly published work) that the work is wholly that of the candidate.

PhD with Integrated Study
In recent years a number of criticisms of the structure of the British PhD have developed from potential sponsors of PhD students. Middle Eastern government agencies, in particular, have indicated that the traditional PhD alone does not provide all they want from a PhD programme. They have asked for more breadth and more specific preparation for future careers.

This has led to a new model, which has evolved out of both recent developments within Britain and a critical assessment of the strengths of the American system. This model contains a number of course work elements – including research methods; the broadening of subject knowledge to include cutting-edge thinking across all aspects of a discipline; general skills (of, for example, group work, presentation, knowledge of intellectual property rights issues); and the development of teaching skills.

These course work elements are assessed, and underpin and lead to a traditional PhD thesis; the result, which is now about to be piloted by ten English Universities, including Brighton, should produce a doctoral student with both the depth and breadth which is now required by many international sponsors.

Practice-based PhD in Art and Design
Because of developments in both the role of research and the status of art and design education in universities, a practice-based PhD in art and design has developed in Great Britain. This covers a range of professional and creative fields including, for example, sculpture, film, graphic design, photography and product design.

This involves the presentation to examiners of both a particular work of art or a successful example of design and a written thesis or portfolio of writing. This writing will
include a significant element of written reflection on the genesis, execution and impact of
the work including specifying either or both of:

- the contribution to new knowledge, new forms of perception, new application within
  the work of art or design.
- the contribution to knowledge and to the development of the field of art and design
  practice made by the reflection on the artistic or design process which has taken
  place.

It is important to emphasise here that a central principle of this route (as with all those
described here) is that research activity and outcomes are clearly articulated and
communicated in a way which allows a genuine contribution to knowledge - knowledge
here being regarded as the collective wisdom and skills of humanity in general.

Professional Doctorates
There are already nearly 200 examples of professional doctorates within British
universities. Among the key defining features of these doctorates are:

- The titles are different from PhD – they refer to a particular profession: EdD
  (education), DBA (business management), DPharm (pharmacy) and DEng.
  (engineering).
- They are designed for experienced professionals who want to do a PhD part-time
  while remaining at work.
- Their aim is to make an original contribution to professional knowledge and
  professional practice.
- They are studied in the work-place on an actual problem occurring in the work place.
- They often involves action research. A problem is identified, possible solutions are
  devised, those solutions are implemented, their effectiveness is monitored,
  modifications are made, the revised solutions are implemented – and so on
- There is a significant taught component. This allows the development of a cohort
  identity, the teaching of research methods, the provision of extended subject training,
  the sharing of methodologies, collective debate on common issues, experiences and
  the exploration of the relevance of each research topic to the specific profession
  involved.
This will normally culminate in a thesis or portfolio which is examined in a similar way to the thesis of the traditional PhD, although at times the length may be shorter since the taught component has already been extensively assessed.

The distinction between the aims of this professional doctorate and the PhD can be summed up in one sentence - ‘The PhD aims to produce a professional researcher while the professional doctorate aims to produce a researching professional.’ Of all the routes described here the professional doctorate may ultimately have the most to contribute to the ways in which mutual knowledge transfer can take place between the university and the wider social and economic community.

Four brief points can be made by way of conclusion:

- First this description of a number of possible routes to a doctorate is not intended to suggest that anything goes. All of these models can and must be rigorously quality assured and contain thorough and stringent examination procedures.

- Secondly the maintenance of comparability of standards nationally and internationally will depend on a thorough quality assurance system based on peer review. Collective responsibility amongst universities should here balance institutional autonomy.

- Thirdly the staff who supervise students in any of these models (including that of traditional PhD) need thorough staff development. Poor quality research supervision can lead to some of the most damaging effects that any university lecturer can inflict on a student.

- And finally the notion of the researching professional, able to question and continuously improve his or her own practice must apply as much to university teachers themselves as to engineers, school teachers, business managers and pharmacists.

It would be an unhappy irony indeed if we academics failed to practice what we preach and were not prepared to transform ourselves to meet these new requirements and challenges.

Entrepreneurial Innovations in Gujarat
(AI & Society, Springer-Verlag, Vol. 16.1/2
Dhawal Mehta¹ and Bhalchandra Joshi²
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Summary

Gujarat, better known as entrepreneurial hub of India can be considered as a major centre for innovations happening at the grass root level with strong cultural influence. The enterprising behaviour is largely attributed to typical culture comprising of traditions, values beliefs and attitudes of the region and can be of great interest in light of cross cultural innovation model.

It is believed by many that Indian value system and its hierarchical social structure are obstacles to economic growth or change. The entrepreneurial behaviour in the 19th and 20th century in India was not due to the existence of rigid cast system but primarily due to the lack of economic opportunities. That the India textile industry grew rapidly without any tariff protection and in fact competed with British textile industry is a proof of the vigour of Indian entrepreneurs. In fact Ahmedabad in Gujarat State developed the cotton textile industry to such an extent that it became the Manchester of India. The behaviour of Hindus changed significantly towards entrepreneurial growth despite the fact that the religious and cast rituals remained intact.

It seems that the entrepreneurship is a response to disequilibrium between the perceived opportunities and their exploitation. Gujarati culture, people of all religions and among Hindus from non-bania castes, has put a prestige value on business which no other regions in India did. These factors together with Western ideas and Western contacts created a new ferment in Gujarat's economic development in 19th century which still continues today. “The Manchesterisation of Ahmedabad,” exemplified by the rise of textile entrepreneurship in Ahmedabad showed that the “old money” moved into industry, once the success was demonstrated by a Brahmin and a Patel. Gradually, the Jains, Banias, Parsis and also Patels joined the ranks of industrialists. This new industrial class consolidated itself socially as well as economically and relatively small, close knit agencies, often supplemented by caste ties, made further expansion possible.

As managing agents, they applied the profits of one mill to the requirements of new ones and solicited public and private deposits to cover the major capital requirements. Spodek underlines a paradox that as conservatism plagued Ahmedabad industry, some pioneers like Sarabhai introduced innovations and brought reputation to the entrepreneurial activity.

Multimedia Archiving of Technological Change in a Traditional Creative Industry
(Forthcoming, AI & Society, Springer-Verlag, Vol. 16.4)

David Smith, University of Wales College, Newport
Summary
This article deals with a process of technological change in the traditional \textit{cire perdue} (dhokra) brass-making craft as it is practised by one group of families in Bikna Village, near Bankura in West Bengal, India. This change was initiated and coordinated by the Indian CSIR (Council for Scientific and Industrial Research) agency NISTADS (National Institute for Science, Technology and Development Studies). It involved replacing an ancient traditional but inefficient metal-foundry technique with another which is almost as ancient but more efficient. The impact of this apparently simple change on the dhokra practice has been both profound and rapid.

The name ‘Dhokra’ or ‘Dokra’ was formerly used to indicate a group of nomadic craftsmen, scattered over Bengal, Orissa and Madhya Pradesh in India, and is now generically applied to a variety of beautifully shaped and decorated brassware products created by the \textit{cire perdue} or ‘lost wax’ process. The craft of lost-wax casting is an ancient one in India, and appears to have existed in an unbroken tradition from the earliest days of settled civilisation in the sub-continent. The traditional themes of these cast metal sculptures include images of Hindu or ‘tribal’ gods and goddesses, bowls, figures of people or deities riding elephants, musicians, horse and rider figures, elephants, cattle, and other figures of people, animals, and birds.

Although there is a small but increasing demand for dhokra work from urban Indian families, as well as in the tourist trade, the craft is threatened with extinction. Most of the remaining dhokra communities are extremely poor, and their economic condition has caused many families to leave the craft to find wage employment in local manufacturing centres or in metropolitan centres such as Kolkata (Calcutta).

According to Sen (1994):
“Perhaps the poorest craft group of West Bengal, the Dhokras are the most interesting and creative. In recent years, under the pressure of all-embracing industrialisation and changing social values, they have been forced by the loss of their natural rural market to diversify their products and are now seeking, with the help of the government and some voluntary agencies, a market among urban sophisticates, as creators of decorative ware. These efforts have met with only limited success”.

Sen attributes the roots of this failure to
“…Greedy dealers in handicrafts [who] took advantage of the failure of the government and the voluntary organisations to provide adequate price protection for the producers”. However, the situation is far more complex than simply being a matter of economic exploitation.

Role of Universities in IT Education in India
(AI & Society, Springer-Verlag, Vol. 16.1/2
Abhai Mansingh
University of Delhi

Summary
In the wake of information technology revolution, the paper describes the changing role of universities to promote IT education in India to generate qualitative and competitive manpower in the face of mushrooming of private institutions in the field of IT. The rapid growth of private teaching initiatives reflects inadequacies of the public educational system to the need of emerging IT environment, especially considering the high prices charged by the private training. It is pointed out that the emerging knowledge society and the economy is not going to be based on IT alone, but it will depend on the development of both infotech, as well as, basic research in domain areas. Any policy on IT education should ensure that basic disciplines are not to be ignored. Universities should develop new and innovative programmes for students from different basic disciplines to give training for high-end jobs. To promote IT education a new innovative concept of earning while learning has been introduced recently. Highlights some of the initiatives started by Delhi University to modify / improve the course programmes for IT education looking at the needs of the industry.

The rapid technological changes -- poorly comprehended by even educated people in our society -- along with large-scale wealth creation and commercial dynamism in the Information Technology (IT) sector are raising critical challenges for our universities and the education system. These include commercial exploitation of students and individuals ill-informed of the new technologies, declining importance of the basic sciences in our educational output, and a virtual marginalisation of the university system in the explosive growth of the IT sector. Each of these is detrimental to our society in the long run. How should universities, with their special role in society, react to these challenges, and what role can the University Grants Commission(UGC) and other
government agencies play in developing a meaningful response to these challenges is the subject matter of this paper.

Information Communication Technology : Application in Rural Development
(Project report - Innovation Network Project)

H. S. Sekhon
Punjab Agricultural University (PAU)

Summary
The key role of Punjab Agricultural University, Ludhiana in ushering the Green Revolution beginning mid sixties is well known. Equal partners were also the dynamic & progressive farmers of Punjab, ever ready to adopt new ideas and farming technologies; innovative & hard working artisans along with enterprising manufactures of agricultural machinery and tools; and not the least the supportive policies of the state in encouraging mechanisation, providing and assuring irrigation facilities, inputs like fertilisers & seeds, loans & ample subsidies. This grand dream of sufficiency in food production could not have been achieved without the vast extension network of the University fully integrated with teaching and research & the state department of Agriculture. The policies and activities assure the participation of each concerned in its value-addition chain from the field worker to the top through organising different programmes, and adopting a variety of strategies.

The University has also established a Farmers’ Service Centre for the sale of seeds, answering farmers queries, providing other guidance, etc. The same centre also houses ‘Plant Clinic’ - a novel idea by PAU, which provides facilities for the diagnosis of diseases / pests affecting plant samples brought out by the farmers of the state. The plant samples are diagnosed immediately and remedial advice rendered to the farmers.

Realising the significance of Information Technology in research, teaching and extension of agricultural education and the grand role that it can play in modernising the agricultural production system for its competitive sustainability in the era of market globalisation under WTO regime the Punjab Agricultural University has instituted a Post-Graduate Diploma in Information Technology for its graduate students for agriculture, agricultural engineering, veterinary and home science. Apart from producing man-power for entrepreneurship and providing support for IT enabled services to the rural
community, the training also gives a competitive edge to the professionals in their respective fields enhancing their job prospects.

The inspiration, motivation and academic help came through the EU-India Cross Cultural Innovation Network project in which PAU is one of the Indian partners.

Five Years Journey for Cross Cultural Networking
(Project report-Innovation Network)
Ranjit Singh, PAU

Summary
With overflowing grannaries in Punjab and the introduction of modern technology in the production and processing of agricultural produce, the concept of farming has shifted to the value added agri.. business approach. There is an urgent need to re-orient agriculture in Punjab to match to the changed situation. There are potential opportunities to create wealth along the entire chain from farm gate to food plate.

The visit of Dr. Karamjit Singh Gill to Punjab Agricultural University in early 1997 brought cheers to us with the possibility of coordinating with some European Countries to gain from their farm experiences to provide new directions to agriculture in Punjab. Leaning from the experiences and best practices of others is essential to survive and grow in the open system economy. Dynamic institutions are constantly monitoring information from external environment to compare their process, products and services with the best practices. Discussions on a cross-cultural innovation network project were really rewarding and turned out to be mutually very fruitful for a long terms perspective.

In April, 2001, the Visit of the European Union delegation headed by Mr. Fischler Commissioner for Agricultural, Rural Development and fisheries was a red-letter day in the history of this project. Delegation has not only visited University farms, and villages but hold a meeting with the senior ministers and officers of the state Government, University experts, innovative farmers and representatives of agro-industry. Thus, the message of EU-India cross-cultural Innovation Network spread throughout the state. Although project was very small in its volume, but never before such an intensive networking has taken place. Intensive coverage given by media to various activities of the project has further strengthened the publicity campaign.

There is a need to make use of the enthusiasm and aspirations created by this project among experts, students, farmers, state government and agro-industry to further
strengthen the cooperation between Europe and Punjab. Both can contribute a lot for each other’s development. We should develop some mechanism not only to maintain relationship developed with various Indian and European partners but to further strengthen the same. This EU-India Innovation project has laid the foundation of understanding and cooperation, upon which a beautiful structure can be constructed.

The HDZ/IMA Concept of Human Centred Systems Development – Past, Present, Future
Statement for the One Day Policy Seminar on Future Directions of Human Centred Systems, held at University of Brighton, 11 July 2001
Dietrich Brandt
Aachen

Summary
The history of Human centred technology research at the HDZ/IMA started with the first HDZ research team in 1974 which aimed at developing its own counter-concept to the then leading vision of the un-manned factory. Since then this concept of the HDZ/IMA has shaped all research, development and teaching of the department. It is characterised by the aim to balance the different aspects and requirements of people, organisation and technology which make up complex socio-technical systems within their social and natural environment. Thus we are aiming at a holistic or comprehensive view of technology.

With this concept, the HDZ/IMA is today one of the largest and one of the leading engineering departments in Germany with about 30 full-time research staff. They are mainly paid out of university-industry and Government research contracts. This research concept was originally – among other influences - based on the views of certain philosophers (e.g. Habermas, Enzensberger etc.). It got its dynamics through the German unions’ struggles to come to terms with massive automation in German industry at that time. It developed further through close interaction with people we all know: Rosenbrock, Cooley, Liesl Klein; Sheridan, Rasmussen; Garibaldo, Butera, de Michelis; in Germany Broedner, Rauner, Rieckmann, Tomas Martin; the IFAC community (the Committee on Social Impact of Automation); in recent years Gill and the EU-India project, Goodall and the ENIMM - VIRT-U projects etc.. During these years, the main actors of the Aachen team (also internationally visible) have been Klaus Henning, Robert
Recently I have tried to integrate the different views, experiences and visions of all these people – and many more – into the Memorandum which I drafted in 2000 for the VDI World Engineers' Convention, Professional Congress Information and Communication, Hannover, 19-21 June 2000. A condensed version of this Memorandum follows here.

**Information and Communication: The Memorandum** (condensed)

The Information and Communication Technologies today and tomorrow may allow everybody

- to communicate with anybody anytime, anywhere, by sound and picture
- to gather, store and retrieve any data and information world-wide,
- to make any business transactions within seconds: shifting huge amounts of money about; selling, buying, moving goods world-wide; remote-controlling machines and people across and between continents, etc.

The technologies will show **symbiotic/adaptive** patterns in dealing with humans: they sense human emotions and are able to respond to them, they model their own actions by copying human behaviour. Thus these technologies demonstrate their own "emotional" patterns of behaviour and change our perception of technology around us in our lives.

The technologies support **co-operation** of people by storing and retrieving the shared knowledge and experiences of the group and making them available to all members. They lead to new professional patterns of knowledge management and knowledge broking, continuous learning processes for everybody and new dynamics of groups.

Global **communication networks** trigger both strong economic co-operation and mutual dependencies of large enterprises and countries. We all across societies with access to these means, enjoy these developments, we use them in our professions and in private life, we have fun and excitement, and we appreciate the business value and the financial perspectives and advantages going with the information and communication technologies.
Questions, however, are arising with these technologies in a similar way as with the other, today already more traditional technologies. Engineers are twice challenged by these questions:

- firstly to follow them up through their professional and technology-oriented tasks
- secondly, as members of society, to join in the discussions of the non-technical aspects and the social impact of technology.

The following trends, challenges and tasks of Information and Communication Technologies are the results of the Congress on Information and Communication during the World Engineers’ Convention 2000 in Hanover. They have been discussed and agreed on by the participants of the Congress workshops.

Global versus Regional Development: Law and Governance
- Entrepreneurship on Different Scales: Economics and Business
- Data Availability versus Data Security: Transportation and Processing of Data
- Reality versus Virtuality: Acting within the Global Net
- Education: Technology-based and Traditional Education
- The Ethics of Multimedia Information and Internet-based Action

Future Of Human Centred Systems Research
(Policy Seminar on Future Directions of Human Centred Systems, University of Brighton, July 01)
Mike Cooley
TIA, Slough

Summary

Contextual Stimulus Points for Possible Consideration
1. Scientific and technological progress viewed historically has been double edged. It produced the beauty of Venice but the hideousness of Chernobyl; the caring therapy of Röntgen's X-rays alongside the destruction of Hiroshima. How can we identify the positive and negative features, building upon the former and marginalising the latter?
2. Technological change renders systems active and human beings passive. We confer life on machines and diminish ourselves.
3. Humans become more like machines and machines more like humans (the Turing test). There is a convergence rather than a symbiosis.

4. Through information, storage and retrieval systems, socialised knowledge is going up whilst in a relative sense, individual knowledge is going down. Furthermore, through narrow specialisation we have moved from slender knowledge of deep subjects to deep knowledge of slender subjects.

5. There is a form of technological narcissism in which we perceive ourselves as mirror images of our machines. One can identify three phyla of machines: machines that walk, machines that feed and machines that think.

6. For Human Centred Systems we need to design them as tools rather than machines (Heidgger's distinction).

7. The greatest asset any society has is the skill, ingenuity, creativity and imagination of its people. We should use new systems to enhance rather than diminish that asset.

8. There is an over dependence on "science" which means that systems or processes must be predictable, repeatable and quantifiable. By definition this precludes intuition, subjective judgement and tacit knowledge.

9. Propositional knowledge is more highly regarded than tacit knowledge, 'know that' is more highly regarded than 'know how'.

10. Underlying the scientific methodology and technological progress is the notion of 'the one best way'. There are echoes of Leibnitz's "exact language" which would eliminate ambiguity. This tendency, supercharged by globalisation, leads to standardisation and the reduction of diversity - even in the linguistic sense. We are not adequately exploring the valorisation of diversity.

11. Systems are becoming highly synchronised. However, they often lack robustness for if one part of the system goes down, the high level of synchronisation is turned into its opposite in a catastrophe theory sense. The disruption of petrol supplies by a few hundred demonstrators revealed some of the vulnerabilities.

12. Perhaps we need new economic categories when we implement new technologies. How is it that if you grow your own lettuce or repair your own bicycle the gross national product (GNP) goes down, whereas if you get carnage on a motorway it goes up and a Valdez disaster actually stimulates the economy?
13. Communication systems facilitate globalisation of markets but we need to question some of the underlying notions of "efficiency". Mass produced products from the USA are now sold in India displacing small traders and peasant farmers. This may be efficient at the micro level of the individual food corporation but very inefficient at the macro level of the Indian state which has to bear the consequential costs of unemployment and its related problems. Furthermore, there are the environmental costs of transporting products around the world. There is movement in Europe to ensure that the products display not just the price but also the product.km (how far they have come).

14. Should there be some form of Hippocratic Oath for engineers and scientists?

15. Human Centred Systems hold out the prospect of introducing new technologies in such a manner as to celebrate human skill and ingenuity. We need to question the underlying value system which somehow conspires to ensure that they are not widely accepted.

Knowledge Networking In Cross Cultural Settings
(Forthcoming, AI & Society, Springer Verlag, Vol. 16.3, )
Karamjit S Gill
University of Brighton

Summary
Knowledge networking in the cross cultural setting here focuses on promoting a culture of shared communication, values and knowledge, seeking cooperation through valorisation of diversity. The process is seen here in terms of creating new alliances of creators, users, mediators and facilitators of knowledge. At the global level, knowledge networking is seen as a symbiotic relationship between local and global knowledge resources. This focus is informed by the human centred vision of Information Society, which seeks a symbiotic relationship between technology and society. It explores the nature of the knowledge in transition, raising issues of technology and knowledge transfer in the local-global context. The notions of human-machine symbiosis, and diversity and coherence provide a handle to explore the role of technology for sustainable development. The centrality of knowledge in stimulating knowledge networking for cross-cultural collaboration is illustrated through an exemplar of an EU-India Cross-Cultural Innovation Network project, a collaboration between European and Indian universities and institutes.
The notion of knowledge networking for sustainable development here refers to the interdependence between local and global socio-economic systems, and is informed by two human centred notions, subsidiarity and ‘valorisation’ of diversity. The notion of subsidiarity refers to bringing science and scientific knowledge nearer to people with the hope of fostering inter-dependence between the local and the global. The notion of ‘valorization’ here refers to common/global knowledge networks, which build upon the commonalties of local knowledge bases while sustaining local diversities. These notions are rooted in the idea of the symbiosis between human and the machine; between technology and knowledge, and in this particular case a symbiosis between the 'objective' knowledge and the 'tacit' dimension of knowledge. This symbiosis recognises the essential contribution of the 'objective' knowledge as a global resource for knowledge transfer and development. However, it emphasises that sustainable development depends upon the local capacity for acquiring and interpreting new knowledge and then absorbing the transferred knowledge for practical use within new application contexts. This in turn depends on the level of interdependence between the local knowledge and global knowledge. The notion of the 'symbiosis' is intertwined with the dialectical notions of the ‘cause and purpose’ and that of the ‘diversity and coherence’.

Knowledge networking here reflects a belief in the need for much wider diffusion of knowledge, expertise and experience in society. The discussion accepts the argument that whereas the notion of technology transfer has been central to the development of industrial society, knowledge transfer in the wider sense has become a cornerstone of innovation in the information society. Knowledge networking is thus not just about increasing the quantity of information, the speed of its transmission and 'user friendly' interaction, it is also rather about the quality, appropriateness and situatedness of information, and the processes of conversion of information into knowledge.

Knowledge networking is seen as a way of life, sharing knowledge and cultures, building basic trust, democratisation of dialogue, as a process of action, development of coalitions. Networking as an activity is not just about knowledge transfer but also about knowledge gaining. While systems and models of innovation may be transferable, cultural models of innovation may not be transferable, e.g. Gujarat model of innovation may not be transferable outside Gujarat. Models of innovation may be cultural or systems. To transfer a cultural model to a new context, it should either be included as integral part of the transferred culture or a generate the cultural context of model may
need to generated for its effective transfer at the new place. New economic sectors are becoming tacit knowledge intensive rooted in the informal sector; however, old economic sectors have traditionally been objective knowledge intensive rooted in the formal sector. The challenge is how to synchronise the parallel knowledge networks representing the new and economic sectors?

The 'techno-centric' focus of social and economic development is neither 'pre-ordained' nor predetermined. Just as technology can be shaped to serve human purpose, so we can shape social and economic innovations to meet the challenges of employment, health, welfare, inequality and poverty. But this requires a fundamental shift in our view of science and technology, a shift from 'causal' science to 'purposive' science. It also requires a fundamental value change on our part: a shift from the technical to the social, a shift from technical capital to social capital.

Central to the discussion on knowledge networking are the human centred concepts of sustainability, diversity, interdependence, symbiosis, tacit knowledge, human purpose, dialogue, and coherence. The EU-India Cross-Cultural Innovation Network Project illustrates this fundamental shift from techno-centric paradigm to the human centred paradigm.

Launched Innovation Network Project in Brighton

International Conference on Enterprise Cultures and Innovation in the Information Society, September 1999

"I would like to begin by reflecting about the concept of globalisation. There is much talk about globalisation and its effect on higher education nationally and internationally. However most of that dialogue – most of that discourse – is in a competitive context and is hence defensive. It throws up questions like the following:

How can the United Kingdom or the United States hold on the advantage of the English Language in the international education context?

How can large dispersed societies, especially democracies like India, prevent the invasion of commercial distance learning?

This project is also in a global context but it is very different from much of that activity and much of that discourse. This project is born of genuine collaboration and its desire to reinforce mutual respect. The partners are seeking, as in all of the best partnerships, neither to maximise their advantages, nor to minimise their disadvantages. Instead the
two broad groups from the European Union and from India have come together to learn from each other and to share. I am very proud that the University of Brighton has been selected as the hub of this enterprise. As many of you will know, this project fits very neatly with four aspects of our mission as an institution of higher learning and our strategic plan.” (Professor Sir David Watson, Vice-Chancellor, University of Brighton, welcoming delegates at the Int. Conference, Brighton, Step. 1999)

“When I heard of this project – have worked on many EC projects in the past – I must say I was amazed at the scale, breadth and nature of this project. It is not large in financial terms, but the potential of this project is truly enormous. The scope is covered in three major areas – university or academic work, media and enterprise – and it brings together India - the second most populous country in the world with 95 languages and over 1000 million people. A country that is clearly going to play a major role not only in the Asian economy but on the world scale in coming years. The European Community with its 15 members from its Celtic windswept north west to its Hellenic sun soaked south east – two extraordinary groupings coming together and the fusion already is so exciting to behold that the energy and creativity that is released.

Now the priority of the project is to create mutual understanding between India and the EU. I suppose that in the past, the practical response might be to set up innumerable committees that would draw up declarations of understanding . This is elegantly simple. It is based on the premise that people get to understand each other by working together. It is a form of learning by doing. …

So I would like to congratulate the University of Brighton in arranging this, in particular Professor Gill whose vision and imagination has given rise to one of the most exciting projects that we have in this EU India programme. I convey you the best wishes of the Scientific Committee.” (Professor Mike Cooley, the then Chairman of the Scientific Committee of the EU-India Economic Cross-cultural programme, at the Int. Conf., Brighton, Step. 1999)

“Many of the issues raised by Sir David – partnership, not competition, employment not money for development, innovation, communication - positive features are what Mike Cooley said – I think these are the key terminologies in this programme - and we see that the Indian Sub-continent is also deeply engaged in understanding the significance, the meaning and the utility of these key concepts. Surely, a true statement that we are
a diverse community. Interestingly, so is Europe – the key question here is that can we build upon diversities – can we build partnerships?

........ The kind of diversity that we see in this network, we have India, startlingly diverse but the same features – a rich country and then poor. Rich in terms of knowledge of individuals, rich in terms of experiences, rich in terms of knowledge – not necessarily the knowledge that we learn in the universities but knowledge that resides in communities. It manifests in the saris that women wear, it manifests in the curry that we eat and it manifests in several production units – spread all over the country. ........

It is an amazing opportunity for all of us since we are talking of working in partnership. We, at least Indians in the network, do not think that this programme is about the four institutions in India and the five institutions in Europe. It is about Indian people and the Europeans. It is about Asia and Europe. That is the way we would like to look at it and it is in that spirit that we have come to Brighton – to create a network of like minded people, of people who matter, of people who may not be very vocal and yet very knowledgeable." (Dr. Ashok Jain, former Director of NISTADS, New Delhi, at the Int. Conf. on , Brighton, Step. 1999)

“...The connections and partnerships that are trying to be forged here have a great potential for a great many cultures and communities across our international boundaries. I think this is the project on which we will be able to build. I know that I speak on behalf of Brighton and Hove Council when I say that it is something that we would want to take hold of with both hands and run with because we are a place that is wanting to connect communities – school communities, university communities and voluntary groups together through the information network. ...

I look forward to the outcomes of the project and I am delighted to have been invited to part of your opening session and indeed to be here as part of Brighton University because if there is a place at all that can host a thing well it is the University of Brighton. They are pioneers and I think you will discover that just by the welcome and the work that they will have put in to ensure that this conference is a success. I am looking forward to the outcome and I will watch it with interest. Thank you very much for inviting me just to see the faces of academics, professors and one or two ordinary people.” (Cllr Jenny Langston, the Mayor of City of Brighton & Hove, welcoming delegates at the Int. Conf. on, Brighton, Step. 1999)
“Culture and cultural diversity is the central asset. If you have not cultural diversity, if you don’t foster cultural diversity, if you don’t capitalise on that where is the creativity. In a mono-dominant cultural society there is no creativity left. And finally the aims of society are shifting. We are not a society any more or less and less, a society aiming at producing objects, cheap and many. More and more cheap objects. We are shifting slowly and in silence towards a society aiming at promoting human growth, human creativity including the spiritual dimension because as you know, certainly the Indians know better than anyone else in the world where is human dimension without the spiritual dimension?........

Inclusivity as opposed to exclusion. We have to be inclusive. Not because we are good. This is the only way to get creativity to increase. We have to capitalise on cultural diversity, we have to be open to spiritual dimensions and imagine ways to enchant people. People will move if they think it is meaningful. They will not if they think it is a new trick, a technological trick coming from Delhi or from Brussels and they are right.

The conclusion is that we, the western people, need the Indian wisdom. We need you. We are in deep trouble, we are in deep change, we don’t know the way. The history has ripped us out of our superiority complex but we don’t see it, we just live through. So we need each other.” (Mr. Marc Luyckx, Forward Study Unit, European Commission, at the Int. Conf. on , Brighton, Step. 1999)

“Complexity and size came home to me and it seemed from listening to a lot of people that we are in constant danger of making things complex. Far far too complex than we need to. Simplicity is now becoming a fashion ….. already a fashion in the USA as you probably know, but the business about not being able to get our arms around some of the problems is because we create them. We create these complex problems. What I am terribly impressed by is that from the Indian part of this cross cultural project you are very well aware of that and you are determined not to fall in to that trap. Creativity is of course in my heart and for ten years I have actually specialised in that. I love the quote by Jung and I can’t quite remember the whole thing but he starts out by saying “We are the second creator.” He goes on to say how we create and how if we weren’t able to
create where would we be, we would be just size and moans in the dark.” (Bob Muller, at the Int. Conf, Brighton, Sep. 1999)
PAU to tie up with EU

PUNJAB Agricultural University will collaborate with the European Union to develop joint programmes with the selected institutions of European countries. Under its programme a EU-India cross-cultural innovation network has been established. Dr. G.S. Kalkat, Vice-Chancellor PAU signed the agreement on behalf of the University and University of Brighton on behalf of the European Union.

The expertise and experience of various countries of the European Union will be utilized to plan new teaching and research programmes. A detailed information about PAU, its achievements in the field of education, research and extension will be put online website of the European Union. In this regard a six member delegation from European countries visited PAU and had detailed discussions with the Vice-Chancellor and other ofﬁcers of the University last month.

Later, based on the discussions it was decided that the University of Brighton (UK) will collaborate with PAU in developing postgraduate courses in the ﬁeld of information technology.

Dr. Gordon Bull, the Dean of Information Technology, faculty of Brighton University prepared a detailed plan for this purpose. Possibilities are being explored to collaborate with Denmark in the ﬁeld of processing of agricultural produce.

Dr. Lauge Rasmussen who was a member of the delegation disclosed that 3/4 agricultural produce of Denmark is exported after processing. Technical University of Aachen (Germany) will assist in developing a model of close collaboration between industry and the university.

Dr. David Smith from the University of Wales assured to train the PAU teachers in the use of multimedia. According to Dr. Karamjit Singh Gill, University of Brighton and the coordinator of this project will hold their next meeting at Brighton. Initially, the project had been planned for three years but now there is every likelihood of its continuation.

The project is being financed by the commission of the European Communities. Dr. Ranjit Singh, professor of extension education will be the coordinator at Punjab Agricultural University.
EU Commissioner for Agriculture
Fischler to visit India from April 16 - 18

NEW DELHI, April 12: The European Commissioner for Agriculture, Rural Development and Fisheries, Mr. Franz Fischler, will be on an official visit to India from April 16 - 18 to discuss multi-lateral and bilateral issues with Indian leaders and officials. Mr. Fischler will meet the Union Minister for Agriculture, Mr. Nitish Kumar and the Union Minister for Rural Development, Mr. Venkaiah Naidu. Mr. Fischler, who is responsible for WTO negotiations on agriculture, will also meet the Union Minister for Commerce and Industry, Mr. Murasoli Maran.

Mr. Fischler will meet the Parliamentary Committee on Agriculture and the Leader of the Opposition in the Rajya Sabha, Dr. Manmohan Singh, as well as representatives of the All India Rice Exporters Association and the Indian Sugar Manufacturers Association. He will address the Indian business community at a meeting organised by the Federation of Indian Chambers of Commerce and Industry on 17 April. The same day at 5.00 p.m. Mr. Fischler will address a Press Conference at the E C Delegation, 65 Golf Links, New Delhi 110 003.

On Wednesday, 18 April Mr. Fischler will visit the Punjab Agricultural University at Ludhiana, Punjab, where he will meet the faculty and students besides visiting the EU-India Cross Cultural Innovation Network project implemented under the EU-India Economic Cross-Cultural Programme. Mr. Fischler will also interact with a group of farmers as well as meet with Punjab state ministers and officials.

Commenting on his visit, Mr. Fischler said, “This visit should open up a dialogue. Agriculture still plays a major role in India’s economy. In the light of the ongoing WTO negotiations on agriculture, there is a need for India and the EU to build bridges, to work together in order to better understand each other’s position. I hope that this will enable us to find common ground and thereby contribute to the success of the WTO negotiations. It is obvious that a future WTO agreement on agriculture will have to address the genuine needs of all WTO members, in particular the needs of the developing countries. We are counting on a positive contribution of India in order to strengthen the foundations for a sound and fair agricultural trading system for the years ahead.” Fischler stated.

The 15-member European Union is India’s largest trading partner and accounts for one-fourth of India’s total imports and exports. Agricultural items constitute roughly 10% of India’s exports to the EU and include coffee, tea, wheat, rice, fruits and nuts, and oilseeds. Marine products represent around two per cent of Indian exports to the EU.
A Way Forward on Research Collaboration

Future Direction of Research It is now normal in the EU for research to be undertaken which crosses national, cultural and disciplinary boundaries, and where the interests of the academic, entrepreneurs and social partners are all engaged. We have demonstrated on a small scale that this European model can be transferred to India. Our view is that the direct collaboration between the universities, entrepreneurs and civic society could play a major role in transforming the socio-economic landscape of India. It is clear, however, that this cannot happen overnight. We believe that there is a strong case for a medium/long term programme of strategic cross-cultural and trans-disciplinary research building upon technological innovations and India’s huge pool of tacit knowledge and creative enterprise.

Building on our model of virtual innovation network, we propose to set up a “virtual institute of cross-cultural innovation” to develop research strategies for cross-cultural cooperation. The focus will be on the transfer of knowledge from the universities and regional knowledge centres to the enterprises and civic society, as well as, the transfer of the tacit dimension of knowledge from the civic society and enterprises to the knowledge centres and the universities, both within and beyond the EU-India context

We suggest that EU should work with Indian policy makers to develop a research framework programme, which promotes networks of research communities functioning across institutions and regions of India. As far as this cross-cultural innovation network project is concerned, we believe that our effective contribution to this strategy would be to continue to build on the foundations of the EU-Indian project. Our proposed virtual institute is an effective way of creating sustainable cross-cultural collaboration and initiating new directions of trans-disciplinary research.
Network Partnership and Coordination

European partners
University of Brighton, Brighton (UK)- Network Coordination Partner
Technical University of Denmark (DTU), Lyngby (Denmark)
University of Technology (RWTH), Aachen (Germany)
University of Wales College Newport (UCWN), Newport (Wales)
Istituto per Lavoro (IpL), Bologna (Italy)

Indian Partners
University of Delhi, New Delhi
National Institute of Science, Technology and Development Studies (NISTADS), New Delhi
Punjab Agricultural University (PAU), Ludhiana (Punjab)
GLS Institute (a postgraduate institute of Gujerat University), Ahmedabad (Gujarat)

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